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Skeptical Inquirer

Vol. 35 No. 1 | January/February 2011 THE MAGAZINE FOR SCIENCE & REASON

THE CONSPIRACY MEME

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Conspiracy Theories and Evidence-Based Knowledge

Conspiratorial thinking, like magical thinking, leads people astray from clearly reasoned, evidence-based approaches to assessing extraordinary claims. I doubt there is one among us who doesn't have a friend or relative prone to seeing conspiracies just about everywhere. But while there is good reason to say that paranormal-style magical happenings are unlikely to exist in any real way, conspiracies definitely *do* exist. So the challenge is somehow to identify the real conspiracies and avoid over-obsessing—without good evidence—about imaginary ones. Some people do exactly that.

In our extended cover article in this issue, Rutgers University social scientist Ted Goertzel, who has written extensively on belief in conspiracy theories, brings his informed perspective to this very timely topic. He directly addresses popular conspiracy theories about scientific and technological matters: the AIDS virus, the 1969 Moon landing, the 9/11 attacks, vaccines as a cause of autism, genetically modified foods, climate science, and fear of science in general (among other topics). Like lies and pseudoscientific claims, conspiracy theories are easy to propagate and difficult to refute. In fact, this kind of thinking is self-reinforcing: absence of any evidence of a conspiracy is seen as evidence of an effective cover-up. One mark of many conspiracy theories is cascade logic—when defenders of a conspiracy theory have to implicate more and more people as complicit with the conspiracy. Goertzel provides many useful guidelines for identifying and understanding this kind of thinking. He ends by discussing the consequences of allowing conspiracy theorists to dominate public debate.

* * *

Veteran readers may have noticed something different in SI. Starting with our previous issue, we've done a little bit of a redesign on the contents page, this page, and the opening pages of articles and columns. Letters, reviews, and interviews have also been reworked to allow for quicker reading. The changes aren't drastic. It's not a total makeover. It is an attempt to subtly improve appearance and readability and make more efficient use of space. Our thanks go to SI Art Director Christopher Fix.

* * *

We are pleased to welcome 2,200 new subscribers to the SKEPTICAL INQUIRER—a result of our first subscription campaign in several years. We trust that you new readers will find SI to be a fresh source of scientific thinking and authoritative information about all manner of extraordinary or controversial claims. Evidence-based investigation and analysis is what we're all about. Scientific thinking is not infallible, but it is self-correcting. And it is the best route we have to accurate, reliable knowledge about the natural world. Scholars and educators fed up with unreliable speculation, members of the news media seeking help, and readers in general who are curious about claims they've heard—all look to us to sift fact from fiction, reliable information from misinformation, and sense from nonsense. We've been doing that for a very long time now, but new claims (and old claims in new guises) pop up continually. We're your friendly consumer guide to what is (and isn't) behind them. We welcome your feedback.

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The SKEPTICAL INQUIRER is the official journal of the Committee for Skeptical Inquiry, an international organization.

The SKEPTICAL INQUIRER (ISSN 0194-6730) is published bimonthly by the Committee for Skeptical Inquiry, 3965 Rensch Road, Amherst, NY 14228. Printed in U.S.A. Periodicals postage paid at Buffalo, NY, and at additional mailing offices. Subscription prices: one year (six issues), $35; two years, $60; three years, $84; single issue, $4.95. Canadian and foreign orders: Payment in U.S. funds drawn on a U.S. bank must accompany orders; please add US$10 per year for shipping. Canadian and foreign customers are encouraged to use Visa or MasterCard. Canada Publications Mail Agreement No. 41153509. Return undeliverable Canadian addresses to: IMEX, P.O. Box 4332, Station Rd., Toronto, ON M5W 3J4.

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Subscriptions and changes of address should be addressed to: SKEPTICAL INQUIRER, P.O. Box 703, Amherst, NY 14226-0703. Or call toll-free 1-800-634-1610 (outside the U.S. call 716-636-1425). Old address as well as new are necessary for change of subscriber's address, with six weeks advance notice. SKEPTICAL INQUIRER subscribers may not speak on behalf of CSI or the SKEPTICAL INQUIRER.

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CSI(COP) Renews and Expands Executive Council, Plans for Future Activities

Kendrick Frazier and Barry Karr

The Committee for Skeptical Inquiry (CSI), publisher of the Skeptical Inquirer, promotes "scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims" (see box for a fuller version of our mission statement).

CSI's official policy-making body is its executive council. A variety of circumstances had militated against any meeting of the executive council for several years, but a small CSI planning meeting was held on October 9, 2010, at the Millennium Biltmore Hotel in downtown Los Angeles. The executive council was reconstituted and expanded, and then it met for the rest of the day. The meeting was initiated, organized, and hosted by CSI Executive Director Barry Karr.

Members of the new executive council, who will also serve on this magazine's editorial board, are James E. Alcock (psychologist, York University, Toronto), Kendrick Frazier (science writer; editor, Skeptical Inquirer), Ray Hyman (psychologist, University of Oregon), Scott O. Lilienfeld (psychologist, Emory University; editor, the *Scientific Review of Mental Health Practice*), Amardeo Sarma (chairman of GWUP, the German skeptics group), Eugenie C. Scott (physical anthropologist; executive director, National Center for Science Education), David E. Thomas (physicist/mathematician; president, New Mexicans for Science and Reason), Leonard Tramiel (astrophysicist; board member, Center for Inquiry), and Benjamin Wolozin (cell biologist and researcher into degenerative nerve diseases, Boston University School of Medicine). All but Lilienfeld attended the meeting. Several additional candidates for the executive council are under consideration.

Much of the discussion at the all-day meeting was centered on ideas and plans for strengthening the reach and increasing the visibility of CSI and the Skeptical Inquirer. Possible future CSI activities and events were also considered. Among the topics discussed were better facilitating international cooperation and participation, building bonds with skeptical communities everywhere, supporting local and regional groups, drawing more upon CSI fellows and scientific consultants, social networking interactively with readers and supporters, and helping train small active groups for investigations.

It was decided to resume regular CSI conferences, ideally in late October each year. The next one is tentatively scheduled for October 27–30, 2011. Various sites are under consideration.

One of CSI's main intellectual resources is its group of fellows—outstanding scientists, scholars, and investigators elected for their "distinguished achievement in science and skepticism." At the October meeting, the executive council elected a number of new CSI fellows. These fellows-elect will be announced after invitation letters are sent out and acceptances received. We will report on them in a future issue.

By the way, the possibility of going back to CSI's original name, the Committee for the Scientific Investigation of Claims of the Paranormal (abbreviated CSICOP and pronounced "psi-cop")—which had been in place since its founding in 1976—was raised and briefly discussed, with no action taken. The name was shortened by the executive council in a meeting on September 23, 2006 (see SI, January/February 2007). One suggestion was to keep the new, shorter name but resume use of the CSICOP acronym, which has a long and rich tradition and history.

Readers' and supporters' ideas or comments about any of the topics addressed here may be directed to Executive Director Barry Karr at CSI's Amherst headquarters at skeptinq@aol.com (or through the Skeptical Inquirer's Facebook page), Editor Kendrick Frazier at kendrickfrazier@comcast.net, or any of the executive council members. ■

Your Mission, Should You Choose to Accept . . .

Here is CSI's current, full mission statement as written and approved by its executive council on September 23, 2005:

The **Committee for Skeptical Inquiry** promotes science and scientific inquiry, critical thinking, science education, and the use of reason in examining important issues. It encourages the critical investigation of controversial or extraordinary claims from a responsible, scientific point of view and disseminates factual information about the results of such inquiries to the scientific community, the media, and the public.

This shorter version was created in 2009 (either may be used):

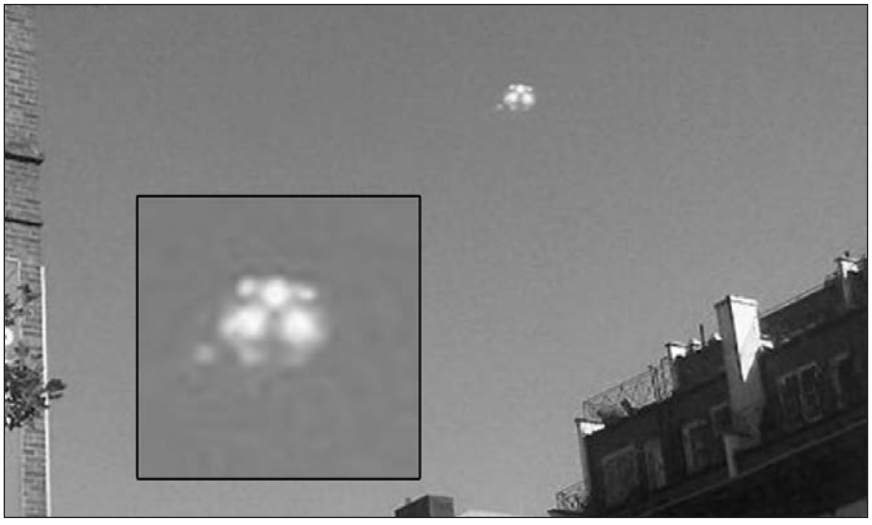
The mission of the **Committee for Skeptical Inquiry** is to promote scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims.

CSI Cracks Manhattan UFO Mystery

Benjamin Radford

New Yorkers are used to odd sights, but what hundreds of people in the Chelsea district of Manhattan's West Side saw in the sky on October 14, 2010, surprised even them.

A cluster of silvery, shiny lights appeared. Initial descriptions of the supposed UFO varied widely. One person said that it was "an oddly shaped object full of lights, flying slowly through the evening sky," while others saw (and recorded) three distinct objects. Still others saw upwards of six. However many clusters there were—and whatever their nature—the city's 311 emergency line received dozens of calls about the mysterious, "extraordinary" lights. Aliens in spacecraft were of course a popular theory, though most New Yorkers seemed to take the lights in stride. Officials said that the objects were not detected as a security threat.



Via Twitter from @jasondiamond

Mysterious light clusters appeared over the Chelsea district of Manhattan on October 14, 2010.

I was asked by a reporter from ABC News to analyze video footage of the mysterious lights in the sky, and a closer look offered clues about their identity. The lights moved independently like floating objects, unlike fixed lights on an aircraft or spacecraft; they moved together in the same direction as the wind and did not show up on radar. Furthermore, the objects were not emitting light but instead reflecting sunlight.

I told the ABC reporter that the lights looked identical to those seen in a reputed UFO video from Buffalo, New York, that Joe Nickell and I analyzed several years ago. We determined that those lights were caused by silver Mylar balloons. Of course I could not conclusively prove that the Manhattan "UFOs" were balloons, based upon the limited information available and videotape evidence, but I offered it as my best professional opinion. On the *Early Show*, anchor Erica Hill reported the story, concluding that law enforcement officials also suspected that the objects were balloons, "but so far [there is] no confirmation. As they said on the *X-Files*, the truth is out there."

Aliens in spacecraft were of course a popular theory, though most New Yorkers seemed to take the lights in stride.

In the late afternoon of the day after the sightings, officials from the Milestone School in nearby Mount Vernon, New York, identified the "UFOs" as some of the helium balloons that had escaped (shortly before the sightings) from an engagement party held for a teacher at the school. "It was just a freak thing. Frankly, I'm shocked by it," said Angela Freeman, head of the school. "The kids had an engagement party for a teacher, and a mother brought four dozen balloons, and she's coming through the door. It is very windy in Mount Vernon. Suddenly, twelve of the balloons let loose." The wind patterns at the time would have taken the balloons to within sight of people in Manhattan's Chelsea area.

The sightings were also very similar to a famous UFO report from New Jersey's Morris County on the evening of January 5, 2009. An eleven-year-old girl noticed some bright lights in the night sky: three lights grouped together and another pair some distance away. The lights, which glowed red, moved silently and slowly, then disappeared one by one. That case, which I also investigated and solved, was some months later revealed to be a hoax created "as a social experiment" (see "CSI Solves New Jersey UFO Mystery," SI, July/August 2009).

Maryland's Highest Court Strikes Down County Law Forbidding Fortune-Telling Businesses

Scott Snell

Montgomery County's 1951 ordinance against fortune-telling for profit has been struck down by the Maryland Court of Appeals. The June 10 opinion overturned a lower court's judgment upholding the ordinance's constitutionality. Fortune-teller Nick Nefedro, represented in part by the American Civil Liberties Union (ACLU) Foundation of Maryland, argued that the fortune-telling ordinance violates his right to freedom of speech under the First Amendment to the United States Constitution and Article 40 of the Maryland Declaration of Rights. The ordinance (Montgomery County Code § 32-7, "Fortunetelling") reads, in part:

> Every person who shall demand or accept any remuneration or gratuity for forecasting or foretelling or for pretending to forecast or foretell the future by cards, palm reading or any other scheme, practice or device shall be subject to punishment for a class B violation . . . in any warrant for a violation of the above provisions, it shall be sufficient to allege that the defendant forecast or foretold or pretended to forecast or foretell the future by a certain scheme, practice or device without setting forth the particular scheme, practice or device employed; provided, that this section shall not apply to any benefit performance. . . .

In the ACLU's view, the ordinance unduly burdens protected speech by forbidding remuneration for speech. Citing earlier rulings that restrictions on payment for protected speech are equivalent to absolute bans on that speech, Nefedro's attorneys recognized the county's interest in preventing fraud but argued that the county had not chosen the least restrictive means to further this interest. By this argument, the county's existing ordinance against deceptive trade practices in consumer exchanges is sufficient, and it is not restrictive of protected speech. Nefedro's legal team also stated, "Rather than being narrowly tailored, the Fortunetelling Ban is substantially overbroad, in that it criminalizes payment for all fortunetelling—whether or not actually fraudulent."

Many or perhaps all psychics privately or publicly hold that their readings are genuine insights, but they present them as solely entertainment due to government regulation.

This viewpoint was reflected in the court's majority opinion:

> . . . the County repeatedly asserts . . . that fortunetelling is "inherently fraudulent" and, as a result, should not receive any First Amendment protection. Indeed, the First Amendment does not protect fraudulent statements. . . . *We are not, however, persuaded that all fortunetelling is fraudulent* [emphasis added]. While we recognize that some fortunetellers may make fraudulent statements, just as some lawyers or journalists may, we see nothing in the record to suggest that fortunetelling always involves fraudulent statements. Indeed, fortunetellers, like magicians or horoscope writers, are able to provide entertainment to their customers or some other benefit that does not deceive those who receive their speech.

The court also referenced an earlier case in which a court "defer[red] to the legislative finding . . . that fortunetelling is inherently deceptive and, therefore, is unprotected speech" but refused to follow its lead, warning that "such deference would allow legislatures to ban any manner of protected speech by simply declaring it 'inherently deceptive.'"

The court's dissenting opinion noted the majority's

> inapt analogy to lawyers and journalists . . . which fails to recognize that, although some lawyers or journalists may make fraudulent statements, the practice of such professions without fraud is attainable. I would affirm the judgment of the Circuit Court for Montgomery County and hold that

Montgomery County's election to protect its citizens (and their money and other assets) from for-profit fortunetellers, palmists, card readers, and the like, does not violate Appellant's constitutional right to free speech.

According to a June 11 *Washington Post* report, Montgomery County Council spokesman Patrick Lacefield was uncertain whether the county would appeal this Maryland Court of Appeals decision.

Elsewhere, many jurisdictions have successfully regulated fortune-telling for profit by allowing it solely for the purpose of entertainment or amusement. The disclaimer "for entertainment purposes only" is widely used in the psychic industry, informing consumers of evidence-based views about the industry while leaving First Amendment protections for psychics intact.

This admittedly oppressive situation could be changed by demonstrably successful fortune-telling, even if at first presented only in an entertainment context.

Meanwhile, many or perhaps all psychics privately or publicly hold that their readings are genuine insights, but they present them as solely entertainment due to government regulation. This admittedly oppressive situation could be changed by demonstrably successful fortune-telling, even if at first presented only in an entertainment context. Successful forecasts would eventually pose a problem for any lawmakers intent on restricting the industry to the entertainment field.

More information is available at http://ncas.org/pdf/2010-Sep-Shadow.pdf. ■

Scott Snell is a flight software engineer at NASA's Goddard Space Flight Center and serves on the board of directors of the National Capital Area Skeptics.

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UFOdom's Most Prolific Author?

A Conversation with Kevin Randle

Kevin Randle is the most prolific UFO author today, but he has ruffled a lot of feathers in UFOlogy by rejecting many "classic" cases. Nonetheless, he thinks that some UFO cases have validity, and he still accepts that aliens crashed at Roswell. SI Contributing Editor **Robert Sheaffer** interviewed Randle to explore their points of agreement and disagreement, finding that Randle gives more weight to "eyewitness testimony" than skeptics typically do.

Kevin, it's good to talk to you again. You and I first met over thirty years ago, in 1977. People will probably be surprised to hear that you used to hang out with Phil Klass and me.

Yes. When I went to D.C. I went sailing with Phil Klass in his sailboat on the Potomac. I remember we got stuck on a sandbar or something.

I remember that sailboat. You and I have kept in touch only occasionally since then. So, Kevin, you served with the army in Vietnam, you served in the Air Force, and you also fought in Iraq.

I was a helicopter pilot with the Army in Vietnam. I was a ground-pounder in the Air Force—I was honorably discharged in 1993. After 9/11, I signed up again with the Iowa National Guard and went to Iraq. I retired in 2009, serving a total of thirty-three years in the military, counting both active and inactive service.

Very impressive. And you've written how many books about UFOs?

I've written twenty-two books on UFOs, not counting UFO-themed fiction books. I might be the most prolific UFO author of all time. I think I have Brad Steiger beat. I should check up sometime to find out.

You've also written fiction books. How many?

I have written twenty-five or thirty books of science fiction, as well as something like forty or fifty books of action-adventure, a western, a murder mystery, and a book about lost gold mines and hidden treasures. In total, it's something over 100 books, counting a couple of foreign editions and special editions.

I've always been amazed at how quickly you write.

I used to have my own "book of the month club." At one point I was writing more than one book a month. In one twelve-month period, I wrote nineteen books.

Wow! Let's talk about the 1999 book *The Abduction Enigma*, which you co-wrote with Russ Estes and the psychologist William P. Cone. That book is pretty skeptical.

Yes, that's made me really popular. I get all kinds of criticisms of it at MUFON [Mutual UFO Network] conferences. If you want to commit UFOlogical suicide, just say that all UFO abductions have a terrestrial explanation. But many of these "abductees" are describing sleep paralysis. The book discusses a multiplicity of explanations, all of them terrestrial-based.

You have some very strong criticisms in it of well-known abductionists.

Yes, many of these supposed abductees are very impressionable and are easily led by [a] hypnotist. The late Dr. John Mack said there was a curious matching of abductees to the researcher. He had commented on this in a number of places, including [C.D.B.] Bryan's book about the MIT conference [*Close Encounters of the Fourth Kind: A Reporter's Notebook on Alien Abduction, UFOs, and the Conference at M.I.T.* (1995)]. We flipped it around, suggesting that the abduction researcher was drawing out those facts that most closely matched

"It is error only, and not truth, that shrinks from inquiry."
– Thomas Paine

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their perceptions of the abduction phenomenon. Mack said that he thought [that this was the case] sometimes but never said it out loud. We gave him the page number in Bryan's book (it's page 270 in the hardback, near the bottom of the page if you're interested enough in looking it up).

In *The Abduction Enigma*, we said this field had not progressed in over twenty years. It's now been another ten or twelve years, and it still has not progressed.

So you don't consider any UFO abduction accounts credible?

If any such accounts might be credible, they would be the Betty Hill or Travis Walton type of abductions [that take place outdoors, usually in a remote place]. Not the kind of abduction where aliens come into your bedroom.

The Budd Hopkins type of abductions?

Actually, I wrote the first published account of this kind of abduction in *Saga* magazine in the 1970s. It was about Pat Roach, although she was then using the alias "Patty Price." Roach claimed a single abduction, [which is] important only because this was the first time that it was reported that the aliens came right into the house. Other, later abductees suggested multiple abductions, which make no scientific sense.

"If you want to commit UFOlogical suicide, just say that all UFO abductions have a terrestrial explanation."

Are there any other of your books you want to mention before we get to your latest one?

In *UFO Crash at Roswell* [1991] we went with the best information we had at the time. We were spending big money on phone calls, travel to Roswell, and so on. We got burned by people early on—[supposed crash witnesses] Frank Kaufmann [and] Glenn Dennis [who have since been shown to have been fabricating]. I might point out that while skeptics believed these two guys were not being candid, it was we on the other side who proved it. And yes, there are those who believe their stories are partially true and that they were agents of disinformation. But no, I don't think so. At least we avoided Gerald Anderson [who has also been discredited].

Your latest book is titled *Crash: When UFOs Fall from the Sky* [New Page Books, 2010]. Do they fall from the sky?

Yes. At least in the strict sense—[as] unidentified falling objects. Some of them are meteors.

How many claims of UFO crashes are described in your book?

[There are] 118 accounts, not counting those mentioned in the introduction and the epilogue. There are lists on the Internet claiming over 300 UFO crashes.

Yes, I've seen those lists. And you make it quite clear in your book that you consider most of the claims to be dubious. How many do you think are credible?

Maybe two: Roswell and Shag Harbour.

Shag Harbour [Nova Scotia, Canada, 1967]? I didn't think there was much evidence for that one.

A lot of people say they saw an object fall into Shag Harbour. And there was involvement of the civil authorities, plus the military. Nothing was recovered. Possibly it was an emergency landing of something. There is a body of documents; it needs further investigation.

What's your take on Roswell today?

I have a problem with the Project Mogul explanation. It doesn't cover the facts. The Mogul staff, including Charles Moore, had gone to Roswell to ask for help in tracking the balloons, which means, of course, that they were aware of the project. The array contained several balloons and radar reflectors, equipment that was quite common at military bases and in weather stations. Nothing there to fool anyone. The Mogul balloon wasn't that special. It consisted of an ordinary weather balloon with a bunch of radar reflectors attached to it. Major Marcel should have known what it was. [Intelligence Officer] Sheridan Cavitt, who went out to examine the object, said later that he knew right away it was a balloon when [he was] standing in the field with Marcel, who was amazed. But he never said, "Hey, Jess . . . it's a weather balloon." He just stood there as mute as the mountains. Never said a word to anyone about the identity of this debris . . . that is, if he could actually tell what it was. Did he tell Col. Blanchard when they got back? No. Even if they were not in his chain of command, they were working on the same investigation. He should have told them.

> "I might point out that while skeptics believed these two guys were not being candid, it was we on the other side who proved it."

According to the only published interview with Mac Brazel [who originally reported the debris], he had first noticed it several weeks earlier, on June 14. But this was before the Kenneth Arnold sighting, and "flying saucers" hadn't been discovered yet, so he didn't think anything of it. But by early July, in the wake of the Arnold sighting and of local sightings, Brazel thought that the unexplained

debris might be significant, so he reported it.

I interviewed his son Bill Brazel, who said that the debris was found near where the sheep were watered. They had to go there every day or two to look after the sheep, and he said the debris was found in July. There was a lot of debris—he was complaining how long it took to pick it all up. This was too much to be a Mogul balloon.

Those Mogul balloons were pretty big, with hundreds of feet of radar reflectors.

Yes, the Mogul arrays were hundreds of feet long, but there wasn't all that much material in them: eight, ten balloons and maybe half a dozen radar targets. It wouldn't have taken much more than fifteen or twenty minutes to collect all the stuff. And they had seen weather balloons at other times. I don't see a terrestrial explanation that covers all the facts. Every member of Blanchard's staff [who] we interviewed—some had died already—said the recovered material was extraterrestrial, with just one exception. Lt. Colonel Robert Barrowclough said that it was all a bunch of nonsense, according to a note he sent to Kent Jeffrey.

What about the one you're calling the Las Vegas crash in 1962, although most of the sightings occurred hundreds of miles north and east of the city? From the description in your book it sounds very much like a bolide meteor.

There are some accounts of anomalous observations, but based on the majority of the accounts I think it probably was a bright meteor.

And what about Kecksburg, Pennsylvania? That claimed UFO crash matches exactly with the Great Lakes Fireball of December 9, 1965.

A number of people say they saw the authorities removing an object from the forest, but others say they were at the reported crash site and saw no military activity or anything unusual. NASA said it might have been a Soviet spacecraft reentering the atmosphere.

Jim Oberg has pretty well ruled out the "Soviet Satellite" possibility.

There is no proof that anything was recovered. Maybe the skeptics have better arguments on this case. I now think that bolides count for far more UFO cases than I'd care to mention.

> "I set a very high bar for the level of evidence required. There are very few authentic UFO cases."

Let's talk about any other UFO cases, other than crashes, that you consider credible.

[U.S. Air Force base in the United Kingdom] Rendlesham, [which was] not a crash but a landing [in 1980]. However, Larry Warren [who claims to have been involved, but this is disputed] is a credibility problem. I don't accept the theory that the flash of light the witnesses saw was the Orford Ness lighthouse [Ian Ridpath's solution]. This case deserves more investigation.

Is there anything else you want to say to the readers of the Skeptical Inquirer?

I read your magazine; it has some interesting stuff. I also watch Penn and Teller's *Bullshit*; it's great. I'm predisposed not to accept stories of UFO crashes. I set a very high bar for the level of evidence required. There are very few authentic UFO cases. However, some skeptical explanations don't fit the facts. Still, I'm getting more skeptical in my old age.

Let's mention that your blog is at www.kevinrandle.blogspot.com/. Kevin, if you ever get to San Diego, we need to get together. We have a whole lot more to talk about.

I try to avoid California as much as possible. You people are nuts out there!

Well, if your avoidance fails, we'll get together. Thank you, Kevin Randle.

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'Pop' Culture: Patent Medicines Become Soda Drinks

The soda fountains of yesteryear—a particularly American phenomenon—were in drug stores for a reason. Introduced in pharmacies at the end of the eighteenth century and increasing in the 1830s, they were an effective means of dispensing medications: adding a small amount of flavoring along with some seltzer (effervescent water) made medicine more palatable (New Orleans, n.d.; Mariani 1994, 291). As part of my studies of snake oil and other cure-alls (Nickell 1998, 2005, 2006)—which ranged over several years and included collecting antique bottles and ephemera and visiting such sites as the Coca-Cola museum—I was struck by the fact that several famous soft drinks had originated as patent medicines, which in turn had their origin in herbal and other folk remedies (see figure 1). Pharmacists claimed the added ingredients "made medicines taste so good, people wanted them, whether they needed them or not, and that's how soft drinks evolved" (New Orleans, n.d.).

Advent of Soda 'Pop'

Mineral water, including naturally carbonated water (figure 2), has long been promoted as a curative for various ailments. As early as the beginning of the sixteenth century, scientists tried to duplicate nature's carbonation process. It fell to Dr. Joseph Priestley (discoverer of oxygen) to advance the first practical process in 1772, thus helping to launch the soda-water industry. In time, flavored soda waters caught on.

Some early soda bottles, such as those for English ginger ale, had rounded bottoms, so they could not be stood upright. This prevented their corks from drying out and shrinking, which kept the gas pressure from causing them to "pop."[1] Later "pop" bottles had patented stoppers (again, see figure 2), including the familiar one from 1891 still used today, called the *crown cork* (a crimped metal cap with a cork liner) (Munsey 1970, 101–10).

Root Beer and Sarsaparilla

Two plant roots particularly, sarsaparilla and sassafras (figure 1), were early recognized for their potent flavor and presumed medicinal properties. In 1830, in his treatise on medical botany, Constantine Rafinesque described the American sassafras tree (an aromatic member of the laurel family) and its qualities, noting that "Indians use a strong decoction to purge and clear the body in the spring." Sassafras has long been used as a tea and "home-remedy spring tonic and blood purifier" (Rafinesque 1830). (I dug the root as a boy in Kentucky, seemingly coming by my interest naturally: my great, great grandparents, Harry and Martha Murphy, were Appalachian herbalists and folk doctors.)

Sassafras was an original, major ingredient in many recipes for root beer, which was brewed in the eighteenth century as a mildly alcoholic beverage. Reportedly, in 1870 an unknown pharmacist created a formula that he billed as a cure-all and offered to the public. However, it was not actually marketed until Philadelphia pharmacist Charles Hires produced a liquid concentrate in small bottles (see figure 3), introducing it at the Philadelphia Centennial Exhibition in 1876. By 1893 the Hires family was selling bottled versions of their carbonated drink, thus securing a place in soft drink history ("History" 2010; "Root beer" 2010). One slogan was "Join Health and Cheer/Drink Hires Rootbeer [sic]" (Munsey 1970, 274).

Ironically, in time, root beer's healthfulness was seriously questioned after safrol (a substance in sassafras oil) was found to cause cancer or permanent liver damage in laboratory animals. The U.S. Food and Drug Administration (FDA) banned sassafras oil in 1960, but inventors soon discovered a process to remove the harmful substance while preserving the flavor ("History" 2010).

Another common ingredient of root beer was sarsaparilla, which was originally sold for medicinal purposes. As early as 1835, the famous religious society, the Shakers, offered in their herb catalogs a syrup of sarsaparilla touted for a variety of ailments, including digestive troubles, rheumatism, jaundice, "secondary syphilis," and more. It contained not only sarsaparilla root but dandelion, mandrake, Indian hemp, and other roots, as well as juniper berries and additional ingredients (Miller 1998, 84–85). Among many famous brands of suppos-

edly curative sarsaparilla were Corbett's (made by Shaker doctor Thomas Corbett), Hood's, and Ayer's (Fike 2006, 214–21).[2]

Like root beer, sarsaparilla evolved into a soft drink (figure 4), a flavored, carbonated concoction that was in time sold only for its taste (Sioux City Sarsaparilla is a current major brand ["Sarsaparilla" 2010]). Both drinks were original concoctions, predating colas and other popular soda drinks ("History" 2010).

Other plant-extract-based drinks, such as birch beer (emerging in the 1880s to compete with root beer), ginger beer, and ginger ale, have histories paralleling root beer and sarsaparilla. Because ginger has been used for centuries for medicinal purposes, ginger ale predates most of the other medicinal soft drinks. Indeed, Vernors brand, said to have originated in 1866, has been called "the first U.S. soft drink" ("Ginger ale" 2010). Then there was Dr. Brown's Cel-Ray, a celery tonic served in New York delicatessens from 1869 and sold as a bottled soda since 1886 ("Dr. Brown's" 2010).

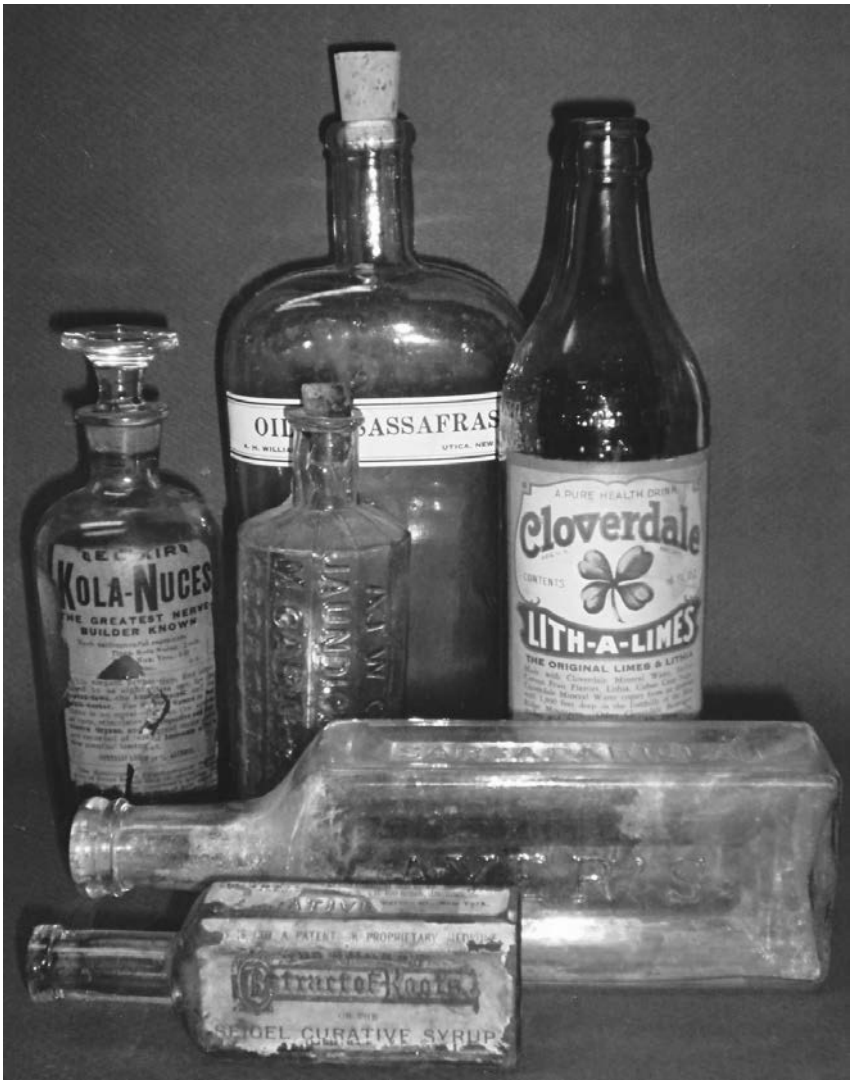

Figure 1. Assortment of bottles representing antecedents or contemporaries of famous early soft drinks—like Coca-Cola and 7 UP—that began as patent medicines. Rearmost bottle: "Oil of Sassafras"; next row, left to right: "Elixir Kola-Nuces," "Atwood's Jaundice Bitters," and "Cloverdale Lith-A-Limes/The Original Limes & Lithia"; next, "Ayer's Sarsaparilla"; and, in front, "The Shaker Extract of Roots or the Seigel Curative Syrup" (containing, among many ingredients, gentian and sassafras). (Author's photo of his collection)

Moxie

Among the earliest patent-medicine-turned-soft-drinks was a New England-based variety, now of limited sales but still remembered for the slang expression, "You've got a lot of Moxie"—meaning a lot of pluck or nerve. The drink was created by Dr. Augustin Thompson, who alleged that it contained extracts from a rare South American plant. Thompson claimed that the unnamed botanical was discovered by his "friend," a Lieutenant Moxie ("Moxie" 2010). Moxie was supposedly a cure for "brain and nervous exhaustion, loss of manhood, imbecility and helplessness, softening of the brain, locomotor ataxia and insanity" (Klein 1999).

Moxie was first formulated circa 1876, but, as its present advertising notes, it has been marketed "Since 1884," by which time Thompson was selling the bottled drink as well as a bulk syrup intended for soda fountains. Moxie was described as "a delicious blend of bitter and sweet, a drink to satisfy everyone's taste." Its unique flavor has been attributed to a key ingredient, "Gentian Root Extractives" ("Moxie" 2010)—gentian root is an ingredient of some types of bitters: a medicinal liquor made by steeping certain botanicals in alcohol (Munsey 1970, 111–13; Balch 2002, 70). (Again, see figure 1.)

Coca-Cola

This classic soft drink originated as a patent medicine selling for five cents a glass at Jacob's pharmacy in Atlanta, Georgia, on May 8, 1886. Because Atlanta and Fulton County had passed prohibition legislation, doctor and pharmacist John S. Pemberton created a non-alcoholic version of a coca wine, then—accidentally it is said—one day added carbonation. The new drink was soon marketed to other drug-store soda fountains where carbonated water was sold in the belief that it was healthful (seltzers were touted, for example, as a cure for obesity [Munsey 1970, 103]). Pemberton claimed that his Coca-Cola cured such diseases as dyspepsia and impotence (Munsey 1970, 105; "Coca-Cola" 2010). It was billed early as "The

Figure 2. Carbonated water required bottles with strong closures, like this one from historic Saratoga Springs, New York. (Author's photo of his collection)

Figure 3. Hires, one of the original root beers, was sold as early as 1876 in a concentrated "Household Extract" form (front), as was Hires ginger ale, and was also later marketed as a carbonated beverage (left, right). Both "pop" bottles shown had crown caps; the one on the left dates from about the end of the nineteenth century, and the other from after May 26, 1936, when that bottle was patented. The latter contained "plant extractives" of birch, sassafras, licorice, sarsaparilla, ginger, and so on, as well as carbonated water, sugar, dextrose, caramel, "and flavor." (Author's photo of his collection)

Ideal Nerve and Brain Tonic. It Cures Headache, Invigorates the System" (CNBC 2010). Pemberton also claimed the drink cured morphine addiction.

In fact, the coca leaf and kola nut (figure 1) used in the drink yielded the addictive substances cocaine and caffeine—hence the name Coca-Cola. However, in time, the small amount of cocaine was reduced and finally eliminated at the turn of the twentieth century (Mariani 1994, 291). (The current product contains only coca flavoring.) Caffeine remained, but in 1912 an amended U.S. Pure Food and Drug Act required that such "habit-forming" and "deleterious" substances in a product be listed on its label ("Coca-Cola" 2010).

Until 1894, the drink was sold exclusively at soda fountains. However, on March 12 of that year, the first Coca-Cola was sold in bottles provided by the Biedenharn Candy Company in Vicksburg, Mississippi. By 1895 the product was distributed throughout the United States and its territories. Cans of the drink were first marketed in 1955 (New Orleans, n.d.; "Coca-Cola" 2010).

Pepsi-Cola

Coca-Cola's main rival began as a carbonated soft drink first called "Brad's Drink" after its creator, Caleb Bradham of New Bern, North Carolina. At his pharmacy there in 1898, he began to concoct a fountain drink that was intended to both aid digestion and boost energy. Its main ingredients—pepsin (a digestive enzyme) and kola nuts—appear to have prompted its later name, Pepsi-Cola. Its trademark application was approved in 1903, and Bradham moved his operation to a rented warehouse where, the following year, the drink began to be shipped out in six-ounce bottles. The first logo was created in 1905, then redesigned in 1926 and 1929.

In 1931, during the Great Depression, Pepsi went bankrupt (largely due to speculation on sugar prices that fluctuated wildly in the wake of World War I) and its assets and trademark were sold. A second bankruptcy just eight years later put the company in the hands of a candy manufacturer, Loft Inc., whose retail stores had soda fountains. Loft's president, Charles Guth, was miffed at Coke's refusal to lower the price on its syrup and intended to replace Coke with Pepsi. He had his chemists reformulate the syrup formula. In 1936, Pepsi introduced a double-sized, twelve-ounce bottle for ten cents, then responded to slow sales by cutting the price to five cents. During the 1940s, a new president, Walter Mack, targeted the African American market with ethnically positive ads. In time, Pepsi became a serious rival of Coke ("Pepsi" 2010).

Dr Pepper

Another popular American soda was first served in about 1885 in Waco, Texas. A concoction created by Charles Alderton, the pharmacist in Morrison's Old Corner Drug Store, the drink was first dubbed a "Waco." Alderton gave the recipe to the owner, Wade Morrison, who christened it Dr. Pepper (seemingly after Dr. Charles T. Pepper of Christiansburg, Virginia, where Morrison once worked as a young pharmacy clerk).

Dr. Pepper was initially sold as an energy drink and "brain tonic." The drink was not nationally marketed until 1904. In the 1950s, the period punctuating "Dr" was dropped. This was for stylistic reasons as well as to eliminate any suggestion of a medical link to the product, which was called "The Friendly Pepper Upper." Courts have held that Dr Pepper is not a "cola" but a distinctively flavored drink. During the early 1980s, after the Dr Pepper company became insolvent, the Federal Trade Commission blocked its acquisition

by Coca-Cola; it then merged with Seven Up (to create Dr Pepper/Seven Up, Inc.) ("Dr Pepper" 2010).

7 UP

St. Louis businessman Charles L. Grigg launched a new soft drink just two weeks prior to the stock market crash of 1929. Originally called "Bib-label Lithiated Lemon-Lime Soda," it contained lithium citrate. Lithium is an element found in many mineral springs (mineral water was often bottled and sold for its allegedly healthful properties), and it was once prescribed for many ailments, including gout, rheumatism, and kidney stones. It did little good for these problems, but it is known as a mood-stabilizing drug. In marketing his drink, Grigg used the slogan, "Takes the 'ouch' out of grouch." The drink's name was later changed to "7 UP"—supposedly the "7" indicated its seven-ounce bottle and the "UP" the rising bubbles from its strong carbonation (Klein 1999; "7 UP" 2010; Nickell 2005).

Like other such "health" drinks, 7 UP had problems. For example, toxic levels of lithium, which is still used to treat manic depression, are rather near its therapeutic levels (Nickell 2005). By the mid-1940s, lithium was fortunately no longer listed on the 7 UP label. Over the years the beverage has been reformulated many times: A diet version (called "Like") was discontinued in 1969 after cyclamate sweetener was banned; the drink's high sodium content was reduced by substituting potassium citrate for sodium citrate; and 7 UP's claim to be "100% Natural" was dropped after the Center for Science in the Public Interest threatened to sue on the grounds that its high-fructose corn syrup resulted from a manufacturing process ("7 UP" 2010; Klein 1999).

* * *

As these major examples show, popular modern soft drinks evolved from late nineteenth- and early twentieth-century patent medicines. Ironically, the touted medicinal effects were actually somewhere between nonexistent and dangerous, but over the years the harmful effects have been rather consistently addressed. We can now turn our attention elsewhere: to the dubious health and medical claims that continue to proliferate under the term "alternative medicine"—often old-style quackery, even if newly bottled. ■

Acknowledgments

Kudos to my wife, Diana Gawen Harris, for suggesting the title "'Pop' Culture" and to my daughter, Cherie Roycroft, for the gift of the rare Kola-Nuces bottle shown in figure 1. I am again grateful to CFI Libraries Director Timothy Binga and librarian Lisa Nolan for their valuable research assistance.

Notes

1. English poet Robert Southey in 1812 described ginger ale as "a nectar, between soda water and ginger beer, and called pop because 'pop goes the cork' when it is drawn" (qtd. in Munsey 1970, 104–5).

2. Although sarsaparilla continues to be promoted by naturopaths and other herbalists as a curative for "a wide range of systemic problems" and is allegedly "especially useful for rheumatoid arthritis" (Naturopathic 1995, 119), peer-reviewed research generally fails to support the claims ("Sarsaparilla" 2010).

Figure 4. Sarsaparilla famously transitioned from a medicine to a soda drink. With the nineteenth-century Hood's bottle (left)—from C.I. Hood & Co., Apothecaries, Lowell, Massachusetts—is a flyer advertising that brand as a "cure" for "Rheumatism," as well as "Dyspepsia, Biliousness, Sick Headache, Indigestion, General Debility, Catarrh & Kidney and Liver Complaints." The soda version (right), from Rochester, New York, dates from after 1903. (Author's photo of his collection)

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The Ruler Incident

Some time ago, the James Randi Educational Foundation came into possession of a bundle of letters written by Sir Arthur Conan Doyle. The letters are of particular interest to researchers of the occult, with topics ranging from the Cottingley Fairies to the Margery investigation.

The Margery investigation began when *Scientific American* offered, in its December 1922 issue, a prize of five thousand dollars to any medium who could produce psychic phenomena that could be declared as such by the unanimous vote of a committee of five appointed investigators. The committee consisted of psychologist Dr. William McDougall, of Harvard University; physicist Dr. Daniel Comstock, of the Massachusetts Institute of Technology; Dr. Walter F. Prince, Research Officer of the American Society for Psychical Research; well-known psychical researcher Hereward Carrington; and Harry Houdini, the great magician. Mr. J. Malcolm Bird, then associate editor of *Scientific American*, was appointed as secretary of the committee.

Bird had approached the psychic world with a more than open mind, and he appeared to be very willing to endorse its reality—even lacking convincing proof. *Scientific American*'s editor put Bird in touch with Sir Arthur Conan Doyle, one of Spiritualism's greatest propagandists, and they began to correspond.

'A Very Self-Sacrificing Lady'

In the summer of 1924, the biggest thing in psychical research was a new medium, who was powerful as well as attractive, named "Margery" (Mina Crandon). She had entered the *Scientific American* competition and was considered to be the likeliest winner of the prize—until Houdini sat with her. In fact, he was immediately able to discern her true methods, and he promptly revealed them to the world. Conan Doyle, who had met Margery and had endorsed her powers, considered Houdini's revelations trash. Bird was of the same opinion; he also appeared to be convinced of Margery's honesty.

The official report of the committee on the Margery case took six months to complete. Committee members had been sworn to reveal nothing about the sittings until the publication of the report; but Bird, who was not restricted by such a burden, repeatedly told journalists what Houdini called "black lies." For example, Bird claimed that Houdini had not allowed anyone to examine the apparatus used during the tests and stated that Houdini had manipulated the apparatus in such a way as to render real phenomena impossible. These attacks on Houdini elated Conan Doyle, who wrote Bird the following letter, dated September 9:

> Dear Bird
>
> Congratulations on your stand against Houdini. I have always said that investigators want to be watched just as the mediums are, so as to have even-handed justice. I have known an investigator, whose name is quoted by the public, [who stated] in a burst out of confidence that he would not hesitate to put muslin in a medium's pockets if thereby he could expose her.
>
> I should think that after your experience over here, and the subsequent experiences you had in America, you cannot yourself have the slightest doubt of the preternatural origin of these phenomena. Nothing is supernatural.
>
> all send best regards
>
> A Conan Doyle. (Conan Doyle, n.d.)

A second, undated note was pinned to the September 9 letter:

> I have only just read the minutes of the Houdini meetings. It is as clear as daylight that the ruler was put in the box, and the rubber in the apparatus by someone who wished to show that the medium was fraudulent. And who could this be save Houdini himself since it only occurred when he was present. Surely the Committee will not stand for this, and will protect a very self-sacrificing lady against such attempts upon her honour. I trust the matter will be most fully ventilated in the Press. It is a complete exposure—but not of the medium.
>
> ACD
>
> As Walter [F. Prince] said "You have all got to die," and will then be faced by these actions. (Conan Doyle, n.d.)

'The Boss Told Me to Do It'

The ruler incident Conan Doyle mentions refers to an episode that happened when Bird was absent from the séance rooms. That particular séance began with Margery confined in a cabinet with armholes, with Houdini and Prince at her sides, holding her hands. Houdini particularly insisted that Prince never let go of the medium's hand until the séance was over. This provoked Margery to ask Houdini what he had on his mind.

> "Do you really want to know?" asked Houdini.
>
> "Yes," said the medium.
>
> "Well, I will tell you. In case you have smuggled anything in to the cabinet-box you can not now conceal it, as both your hands are secured and as far as they are concerned you are helpless."
>
> "Do you want to search me?" she asked.
>
> "No, never mind, let it go," said Houdini. "I am not a physician."
>
> Soon after, Walter appeared in the circle saying, "Houdini, you are very clever indeed but it won't work. I suppose it was an accident those things were left in the cabinet?"
>
> "What was left in the cabinet?" asked the magician.
>
> "Pure accident, was it? You were not here but your assistant was." Walter went on and then stated that a ruler would be found in the cabinet under a pillow at the medium's feet. He then accused Houdini of having had his assistant put it there to throw suspicion on his sister. Then he finished with a violent outburst in which he exclaimed, "Houdini, you Goddamned son of a bitch, get the hell out of here and never come back. If you don't, I will!" (Houdini 1924; Polidoro 2001)

A search of the cabinet revealed the presence of a collapsible carpenter's ruler. But the question remained: who put it there? Houdini claimed it was Margery. By sticking the ruler through the neck opening, the magician explained, she could have easily rung the bell. Also, the medium had suggested that the armholes in the sides of the cabinet be boarded up, which would allow her to move her hands freely inside the cabinet.

A search of the cabinet revealed the presence of a collapsible carpenter's ruler. But the question remained: who put it there?

Margery rejected these accusations and accused Houdini, suggesting that his assistant, Jim Collins, had hidden the ruler to discredit her. However, Collins was interrogated that same night without Houdini present, and he took an oath that he did not place any ruler inside the cabinet, had never seen that ruler, and that his own ruler was in his pocket. According to writer William Lindsay Gresham, Collins actually admitted to hiding the ruler: "I chucked it in the box myself. The Boss told me to do it. He wanted to fix her good" (Gresham 1959).

However, Milbourne Christopher, magician and magic historian, expresses doubts about this incident in *Houdini: The Untold Story* (1969):

> The source of this story, though not given by Gresham, was Fred Keating, a magician who had been a guest of the Crandons in their house on Lime Street at the time Carrington was investigating the medium. Keating, however, was not unbiased. Several days before Gresham spoke to him, Keating had seen an unpublished manuscript in this author's collection in which Houdini, while praising Keating as a magician, had commented in unflattering terms on Keating's abilities as an investigator of psychic phenomena. In this writer's opinion, the story of Collins's admission is sheer fiction.

The incident remains doubtful to this day. It could have been revealing if, at the time, a laboratory had examined the ruler found inside the box for fingerprints or other useful traces. But as it turned out, the *Scientific American* committee was not that scientific after all. ■

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Historical vs. Nomological Sciences

I recently read an interesting paper by Walter Bock ("Multiple Explanations in Darwinian Evolutionary Theory," *Acta Biotheoretica*, March 2010, 58[1]: 65–79) that brought to my mind a fundamental distinction between types of scientific theories: what philosophers call "nomological" vs. historical theories. *Nomology* comes from the Greek *nomos*, meaning "law," and *logos*, of course standing for "the study of." So, nomological theories are those based on law-like phenomena, like Newton's mechanics, Einstein's theory of relativity, or quantum mechanics (hint: it isn't a coincidence that most examples of nomological theories are found in physics or chemistry).

Historical theories, on the other hand, deal with events that could have followed different paths, precisely because they are not determined exactly by natural laws (though, of course, their happening does not violate natural laws). Typically, evolutionary biology and the closely related field of paleontology are considered the standard examples of fields where historical, but not nomological, theories hold sway. For example, one of the most momentous discoveries in paleontology over the past few decades has been the thorough documentation of a series of mass extinction events, at least some of which have been caused by the impact of an extraterrestrial body. These historical episodes clearly do not violate any known law of nature, but neither are they necessarily entailed by any such law. They might or might not have happened, and the fact that they did is a historical contingency, not the required outcome of Newtonian or any other mechanics.

Evolutionary biology is often considered a historical—not nomological—science, but Bock in the aforementioned paper makes an interesting case that standard evolutionary theory is in fact a compound of five distinct sub-theories, four of which are nomological in nature, with the remaining one being historical. The five theories are: 1) an account of heredity to explain how information is passed from one generation to another; 2) the idea that evolution occurs gradually rather than in large jumps; 3) explanations of how speciation (i.e., the origin of new species) occurs, leading to divergence among groups of organisms; 4) the theories of mutation and natural selection as explanations for the existence of differences among individual beings; and 5) common descent, the idea that all living things share common ancestors. According to Bock, only the last theory is truly a historical hypothesis; all the others have the characteristics of natural laws and are therefore nomological.

I'm not sure I am convinced by the specifics of Bock's proposal. To begin with, it depends on what we mean by a "law of nature," a deceptively simple question once you start thinking about it. Typically, scientists think of laws of nature as describing the behavior of matter without exceptions, so much so that a suspension of the laws of nature is thought of as a miracle—i.e., the result

What do we mean by a "law of nature"? It is a deceptively simple question once you start thinking about it.

of the intervention of a supernatural being. Yet, as Lee Smolin documents in his engaging *The Trouble with Physics* (2006), some physicists these days are contemplating the possibility that law-like theories, such as Einstein's general relativity, may hold only for certain spatial or temporal ranges; that is, not universally. We don't know whether that is the case or not, but its possibility highlights the fact that even physicists don't necessarily think of natural laws as, well, laws.

The first four sub-theories of evolution listed by Bock do seem law-like in the sense that they apply to pretty much anywhere within the biosphere of planet Earth (though some biologists would be quick to point out that the occasional exception can be found for almost all of them). But we have no reason to think that a different kind of biology isn't possible on another planet, or indeed could not have evolved on Earth itself given different contingencies early on in the history of life. Indeed, the only component of evolutionary theory that many philosophers do agree looks very much like a law is the principle of natural selection. It can be rephrased as a piece of deductive reasoning where *if* certain conditions hold (heritable variation for fitness-related traits; limited resources), *then* it logically follows that natural selection would evolve a given system, no matter what the specific (historically contingent) characteristics of that system are (e.g., whether the hereditary material is RNA, DNA, or artificially generated computer code).

Things get even more complicated, though, if one thinks about the implications of framing natural selection as an if-then statement. Assuming this is the correct way of thinking about it, natural selection becomes not just a natural law but a logical law! That is, it looks like given certain conditions, natural selection logically has to follow. This is a more powerful concept of natural law than the laws of physics themselves—after all, physicists have (so far) not been able to derive quantum mechanics or relativity from logic. These concepts just happen to describe the way the universe works, but the universe could have been otherwise.

All of the above makes for an addition to the skeptic's toolbox when one is challenged on evolution, particularly because such challenges are often framed as criticisms of evolutionary biology as a "merely" historical science, which everyone "knows" is below par compared to the queen of sciences, physics. Try out the nomological-logical necessity take on natural selection the next time you argue with a creationist, and let me know what happens. ■

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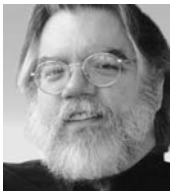
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Left Brained or Right Brained?

Q: I remember you debunking many of the claims about the Brain Gym program ("Exercising the Brain Gym," SI, September/October 2009), but what about the "left brained versus right brained" theories and claims? Are those valid?

—M. Martin

A: The human brain is divided into two hemispheres, and people can be categorized by which half of the brain they most often use. "Right-brained" people tend to be artistic, intuitive, and in touch with their feminine side; "left-brained" people are more logical, analytical, and in touch with their masculine side.

That's the story anyway, according to pop culture pundits, New Age wisdom, and authors who promote books and seminars promising to help harness untapped mind power. It's a widely held idea that holds a certain simplistic, dualistic charm, but is it true? Are some people left brained and others right brained?

The authors of the book *50 Great Myths of Popular Psychology* list the left-brain/right-brain theory as their second myth about the brain:

> There's good evidence that the two sides of the brain, called hemispheres, differ in their functions. For example, different abilities are more affected by injuries to one side of the brain than the other, and brain imaging techniques demonstrate that the hemispheres differ in their activity when people engage in various mental tasks. (Lilienfeld et al. 2010, 26–27)

But before we read too much into this information, we should understand that

> the two halves of the brain differ in *how* they process tasks rather than *what* they process. Let's take language, for example. The left hemisphere is better at the specifics of speech, such as grammar and word generation, whereas the right hemisphere is better at intonation and emphases of speech. . . . The right brain is better at dealing with a general sense of space, whereas the corresponding areas in the left brain become more active when the person locates objects in specific places. In many cases, it's not that one hemisphere or the other can't perform a given task; it's just that one of them can perform it faster and better than the other. (Lilienfeld et al. 2010, 26–27)

Thus there are few, if any, exclusively or specifically "right-brain" or "left-brain" abilities. Indeed, the two hemispheres communicate extensively and continually on both "left-brain" and "right-brain" tasks. Unless the brain is damaged, there isn't even a good way to force it to use one side or the other—the brain will use whatever parts it needs to perform a task. As noted in *Enhancing Human Performance: Issues, Theories, and Techniques*, a book published by the National Academy of Sciences press, there "is no direct evidence that differential hemispheric utilization can be trained" (Druckman and Swets 1988, 110).

So it's true that there are two hemispheres of the brain, but if someone tries to sell you a book or program claiming to "exercise" or "boost" one targeted part, watch out! ■

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"Psychic Vibrations" has appeared in the SKEPTICAL INQUIRER for the past thirty years. Sheaffer is also author of *UFO Sightings: The Evidence* (Prometheus 1998). His website is at www.debunker.com.

A Human Head on a Cow

The Evolver Social Movement (ESM) is a New Age cult-like group dedicated to "the evolutionary transformation of humanity" that promises a "new planetary culture based on ecological values, creative collaboration, and conscious evolution." Though this description may make it sound like a run-of-the-mill New Age organization, the ESM is casting its net far wider than your usual "consciousness transformation" group (which is typically little more than a chatty social club, albeit one that usually makes money for its leaders).

The ESM has claimed for itself quite a large footprint of dubious territory. Subjects covered recently on its website (www.realitysandwich.com) include crop circles, UFO sightings, psychedelic drugs (which supposedly have the power to "open doors that have been closed"), and "the healing power of anger."

But to get an idea of how utterly far-out this group really is, read the article "The Tin-Foil Hat Crowd: Daniel Pinchbeck, U.F.O.'s and the Evolver Movement" by Nicholas Powers in the August 8, 2010, *Indypendent* (http://tinyurl.com/24nfe9n). Pinchbeck, the former editor of *Open City*, is a well-known author and member of the New York literati. Of him, Powers writes:

> He felt empty but ignored it until his friend overdosed on heroin. Pinch-

"[Richard Dolan] was saying that some people on this planet are less human than others. I reflexively snarled. So what should we do? Force people to get DNA testing? Wear arm-bands with a blue star?"—Nicholas Powers

> beck fled to the Amazon to drink potions from shamans to cure himself of nihilism before he died like his friend. Those dizzy vomit soaked trips became his book *Breaking Open the Head* which made him a counter-culture guru. Now he hosts Evolver events, circled by mostly white, well-off audiences who look to him for meaning. [Pinchbeck is the editorial director of ESM's web magazine.] And he gives it to them; shaman drug rituals, Mayan prophecies and a suspicion of reality that adds up to escapism. Our world is a wreck but Pinchbeck has them look outside of it for a truth that can heal it, and the crazier that truth the better.

Powers describes an Evolvers meeting hosted by Pinchbeck titled "Aliens among Us," which Powers attended in New York City. He describes how the

> panelists talked about U.F.O. wreckage and aliens fusing a human head on a cow. I looked at the audience, assuming they weren't buying it until a woman asked, "Who here has had contact with U.F.O.'s?" Like an army lifting their spears, everyone raised their arms. Faces shined with bright defiance. Near the back wall a man in a bright psychedelic shirt waved both hands and danced.

Powers's thought was: "I'm in a room of crazy people."

One woman screamed, "People who have been abducted have increased paranormal abilities."

Another said, "I've seen the labs, they are making human alien hybrids and people must be told!"

Pinchbeck then introduced Bill Birnes, the host of History Channel's *UFO Hunters* and the publisher of *UFO Magazine*, the largest-circulation magazine of its kind. Powers describes Birnes's comments to the meeting's audience:

> The wrinkled raspy man began his gothic tale, "There's a veil of fear. If you dare mention UFOs you are marginalized. No one will deal with you." But Birnes is brave and tells us that UFO wreckage has been turned into modern technology like F-16 jets using "cloaking devices" to disappear. He just flows with crazy Pentagon conspiracies, men screaming in the mountain lab as aliens attacked or aliens fusing a human head on a cow's body. [So *that's* what the aliens have been doing with all those cows they've abducted!] "After we aired the photos there was major payback," his voice was red-hot. "You'll be protected they said but I hope you enjoyed your show because it's cancelled."

Also on the UFO panel was William Gibbs, a therapist who works with supposed UFO abductees, and Richard Dolan, historian and UFO author, who has hosted the TV series *SciFi Investigates* (see "Sci Fi Investigates, Finds Only Pseudoscience," SI, March/April 2007). Powers describes how Dolan

> talked of aliens creating a hybrid-race to take over the world and his words struck something in me. He was saying that some people on this planet are less human than others. I reflexively snarled. So what should we do? Force people to get DNA testing? Wear arm-bands with a blue star? Force them to live in alien ghettos and maybe gas them?

Powers is very sensitive to the political implications of this bizarre belief—and with good reason. If it is widely believed that some persons are not fully human, a new kind of witch hunt becomes a frightening possibility.

* * *

There hasn't been a UFO book on the best-seller lists for quite a while, probably not since Philip Corso's 1997 *The Day After Roswell* (co-authored by the same William "Human-Head-on-a-Cow" Birnes I described earlier). And before that, you'd probably have to go back to Whitley Strieber's *Transformation* in 1988. But this past August, a new UFO book, *UFOs: Generals, Pilots, and Government Officials Go on the Record,* by journalist Leslie Kean, reached number 30 on the *New York Times* best-seller list for nonfiction hardcovers. Like the great majority of mass-market UFO books, it is entirely one-sided, breathlessly repeating the bizarre but exciting claims made by UFO proponents that are backed up not by evidence but by claims alone.

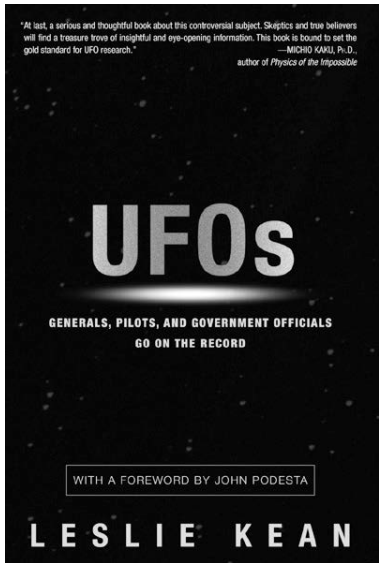
Few if any of the UFO cases in Kean's book are new. Cases already well known in the UFO literature are warmed up and served with a little garnish. If you've been following the UFO literature of the past few decades, there is very little in this book that you haven't already seen. Despite her background as an investigative journalist (and she admits to being an *advocacy*

journalist of the "progressive" kind), when it comes to UFOs, Kean somehow can't distinguish between a *fact* and a *claim*. So not surprisingly, she finds no reason to investigate these claims, completely ignoring the rich skeptical literature on the very cases she trumpets before the media. Look in the book's index, and the names you will *not* find are Philip J. Klass, Donald Menzel, or any other well-known UFO skeptic. Only the pro-UFO side was invited to this tea party.

Kean has been hitting the interview circuit big time, appearing on Fox News, the *Colbert Report*, NPR, MSNBC, and so forth. She has been interviewed by Whitley Strieber, Michio Kaku, and many other talk-radio hosts.

Kean's background is that of a "muckraking" journalist, not a UFOlogist, and thus she apparently does not perceive the quicksand before stepping into it. She has stepped into "exopolitics," the "political implications of the extraterrestrial presence"—which is one of the wildest branches of contemporary UFOlogy, as I've illustrated in several recent columns. Recently Kean sat down for a sixty-minute interview with exopolitics proponent Alfred Lambremont Webre, in which Kean revealed that she plans to approach Congress and the Obama administration to press for UFO disclosure (http://tinyurl.com/WebreKean). She also proposed the creation of a small UFO agency within the U.S. government. Kean expressed disappointment with the UFO documents released thus far under the Freedom of Information Act and in other circumstances. "We're not going to get the ones we want," she said, referring to the "National Security" documents. She has no doubt whatever that secret documents exist, hidden away in the Pentagon or wherever, that reveal government knowledge of the existence of UFOs and their true origin. The release of such supposed documents has been the Holy Grail of UFOlogists for at least fifty years, and it's always been just around the corner.

When it comes to UFOs, Kean somehow can't distinguish between a fact and a claim. So not surprisingly, she finds no reason to investigate these claims.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UFOs
GENERALS, PILOTS, AND GOVERNMENT OFFICIALS GO ON THE RECORD
WITH A FOREWORD BY JOHN PODESTA
LESLIE KEAN

Kean comes to no conclusion about what UFOs really are, and she says she is "agnostic" about that point. Webre doesn't think that's a good idea:

> One immediate outcome of Ms. Kean's 'militant agnosticism about whether any UFOs have any extraterrestrial origin, neither believing nor rejecting this' is to de-link UFOs and extraterrestrial life, and thereby facilitate the continued truth embargo around the U.S. government's secret human-extraterrestrial liaison programs of long-standing.
>
> The existence of long-standing human-extraterrestrial liaison programs has been documented to a certainty by the standards of the law of evidence, through whistleblower and documentary evidence, such as the strategic relationship between the U.S. government and the intelligent civilization living under the surface of Mars."

Webre writes that in her ExopoliticsTV interview, "Ms. Kean states she is not aware of reliable whistleblower or documentary evidence of anti-gravity UFOs of U.S. military intelligence. However, she states, she is open to reviewing substantial and reliable evidence of U.S. black budget anti-gravity UFOs if that is made available to her."

Webre would like to include among those appearing before Congress "whistleblowers such as Michael Relfe, a former U.S. Armed Serviceman who states he spent twenty years on a U.S. secret base on Mars, and Aaron McCollum, who states he routinely deployed in U.S. military anti-gravity UFOs." However, Kean suggested that it's not good strategy to offer up tales like that without proof because of the danger of increasing the ridicule factor, so one must be "very discriminating" about what information one presents. And apparently that "discrimination" also requires ignoring all messy skeptical analyses of her favorite UFO cases that might cloud up the pretty picture she's trying to present to the government and to the media. ■

Check out Robert Sheaffer's new blog, *Bad UFOs* (**www.BadUFOs.com**). It is the first blog covering new and recent UFO-related reports and activities that is written by an experienced UFO skeptic.

Steven Novella, MD, is assistant professor of neurology at Yale School of Medicine, the host of the *Skeptics' Guide to the Universe* podcast, author of the *NeuroLogica* blog, executive editor of the *Science-Based Medicine* blog, and president of the New England Skeptical Society.

Magnetic Healing: An Old Scam That Never Dies

Magnetic charms, bracelets, insoles, and braces remain popular and are sold with claims that they improve athletic performance, relieve arthritis pain, increase energy, and pretty much treat whatever symptoms you might have. These products may seem modern and high-tech, but similar devices and claims have been around for centuries.

The notion that magnets can be used for healing has existed since humans discovered them. Several ancient cultures, such as those of Egypt, Greece, and China, discovered natural magnetic rocks, or lodestones. People had a hard time explaining the unusual properties of these rocks given the scientific knowledge of the time, so they came up with fanciful explanations like "minerals have souls too." This was compatible with the general belief that everything has an "essence."

It was also observed that this magnetic property can be transferred. Socrates wrote: "That stone not only attracts iron rings, but imparts to them a similar power of attracting other rings; and sometimes you may see many pieces of iron and rings suspended from one another to form quite a long chain; and all of them derive their power of suspension from the original stone" (quoted in Keithley 1999).

Through the centuries magnetic healing has been very popular—and its popularity has only increased with advancing scientific understanding of magnetism and the eventual discovery of electromagnetism.

It then seemed natural that because living things have an energy and essence, and certain rocks contain an energy and essence, that such rocks could be used to heal illness—to transfer their energy to a living being. Even today, this idea has an emotional and even rational appeal. Who wouldn't want to be healed by the equivalent of McCoy's medical scanner, which noninvasively uses invisible and painless energy fields to return our tissues to health at the cellular level. When we fantasize about future medicine, that is what we imagine. It is no surprise, then, that through the centuries magnetic healing has been very popular—and its popularity has only increased with advancing scientific understanding of magnetism and the eventual discovery of electromagnetism.

The relationship between medical academia and popular marketing hasn't changed in hundreds of years either. In 1600, William Gilbert wrote *De Magnete*, in which he described detailed experiments with magnets and electricity and systematically disproved hundreds of popular health claims for such treatments. This established debunking of magnetic therapy continued into the seventeenth century with Thomas Browne (Macklis 1993). Considering how primitive scientific methods and

medical knowledge were at this time, the claims of magnetic healers must have been especially fantastical and their treatments remarkably worthless.

But "The Man" was not able to keep magnetic healing down. In the eighteenth and nineteenth centuries, Franz Mesmer dramatically increased the popularity of magnetic healing with his "animal magnetism" theory. Mesmer thought that animal magnetism was a unique force of nature that flowed like a fluid through living things. He also thought he could manipulate it through a combination of hypnotism and laying-on of hands. After a high-profile debunking by a commission led by Benjamin Franklin, however, Mesmer's fame faded, and he died poor and forgotten. But his legacy survived—magnetic healing remains very popular to this day.

Today the relationship among magnets, popular health claims, and the medical/scientific community remains the same. The public is fascinated by the notion of healing with electricity, electromagnetic fields, and magnetic energy. The fact that many medical interventions are legitimately based upon electromagnetism increases this interest. People understand that we use magnetic resonance imaging (MRI) to peer into the body. Recent studies indicate the potential for transcranial magnetic stimulation as an effective treatment for migraines (Lipton and Pearlman 2010). We routinely measure electrical (and now even magnetic) brain waves to assess brain function.

Electromagnetism is the real energy of life, and therefore it is very plausible that all sorts of magnetic and electrical interventions will be useful for diagnostic and therapeutic purposes. But this potential also opens up a market for countless quack magnetic devices that exploit this appeal. You can buy what are essentially refrigerator magnets to strap to your elbow or knee or put in your shoe or under your pillow. These static magnetic fields have no demonstrable effect on blood flow or living tissue, and their fields are so shallow that they barely extend beyond the cloth in which they are encased, let alone to any significant tissue depth. The scientific evidence for their efficacy is negative (Pittler et al. 2007). Even more absurd are magnetic bracelets that are supposed to have a remote healing effect on the body. Their plausibility plummets even further.

It is eternally frustrating that scientific evidence and academic acceptance of medical claims seem to have no bearing on the marketing and popular appeal of those claims. This disconnect appears to be especially true of claims for magnetic devices and treatments—and it has survived for centuries. ■

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THE CONSPIRACY MEME

WHY CONSPIRACY THEORIES APPEAL AND PERSIST

Conspiracy theorizing is a rhetorical meme that transforms scientific controversies into human dramas with villains who can be exposed. It uses controversial facts and speculations to undermine scientific evidence.

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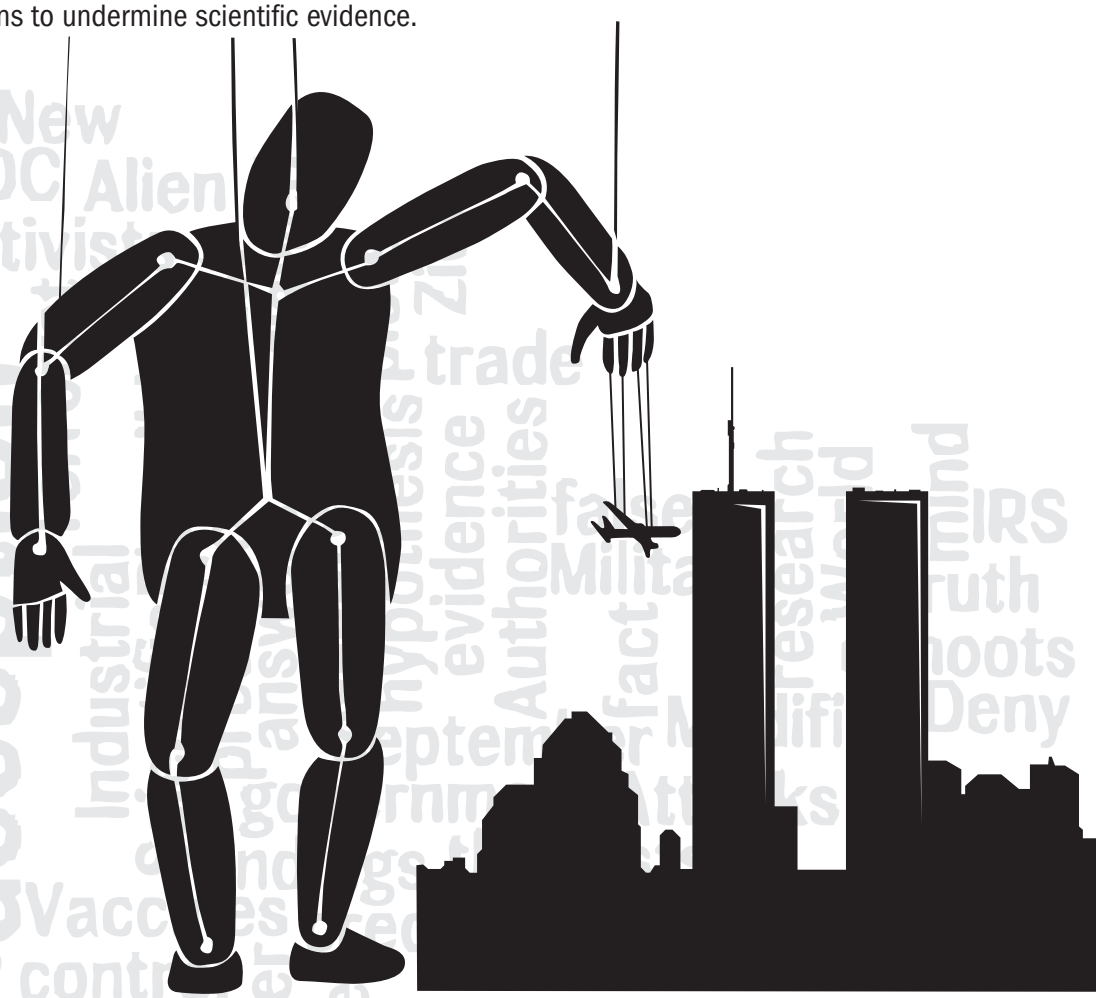


Conspiracy theories are easy to propagate and difficult to refute. Having long flourished in politics and religion, they have also spread into science and medicine. It is useful to think of conspiracy theorizing as a *meme*, a cultural invention that passes from one mind to another and thrives, or declines, through a process analogous to genetic selection (Dawkins 1976). The conspiracy meme competes with other rhetorical memes, such as the fair debate meme, the scientific expertise meme, and the resistance to orthodoxy meme.

The central logic of the conspiracy meme is to question, often on speculative grounds, everything the "establishment" says or does and to demand immediate, comprehensive, and convincing answers to all questions. Unconvincing answers are taken as proof of conspiratorial deception. A good example is the film *Loose Change 9/11: An American Coup* (Avery 2009), which started out as a short fictional 2005 video about the World Trade Center attacks that was marketed as if it were a truth-seeking documentary. The 2005 video went viral on the Internet and has been viewed by over ten million people. *Loose Change* raises a long series of questions illustrated by tendentious information, such as the fact that the fires in the World Trade Center were not hot enough to melt steel. But no one had claimed that the steel had melted, only that it had gotten hot enough to weaken and collapse, which it did. The video presents the fact that the U.S. Internal Revenue Service (IRS) is keeping certain people's tax returns secret, set to an ominous musical background suggestive of evildoing—despite the well-known fact that the IRS keeps *everyone's* tax returns secret.

When an alleged fact is debunked, the conspiracy meme often just replaces it with another fact. One of the producers of *Loose Change*, Korey Rowe, stated, "We don't ever come out and say that everything we say is 100 percent [correct]. We know there are errors in the documentary, and we've actually left them in there so that people [will] discredit us and do the research for themselves" (Slensky 2006).

When the conspiracy meme is reinforced by a regular diet of "alternative" videos and one-sided literature, it can become a habitual way of thinking. People who believe in one conspiracy are more likely to believe in others (Goertzel 1994; Kramer 1998). A young self-declared conspiracy theorist challenged me to debate one conspiracy theory per week with him, including theories about genetically modified (GM) foods, vaccine neurotoxins, AIDS, and September 11, 2001. He expressed his "true belief" that there is a "kernel of truth" in almost every conspiracy theory and claimed that once you understand the kernel, all you have to do is "connect the dots to make a picture."

Conspiracy theorists have connected a lot of dots. The ninety-two conspiracy theories described in a recent handbook (McConnachie and Tudge 2008) range in topic from Tutankhamen and the curse of the pharaoh, the *Protocols of the Elders of Zion*, and satanic ritual abuse to the alleged scheming of the Council on Foreign Relations, the Trilateral Commission, and the British royal family. Other theories involve religious cults, alien abductions, or terrorist plots. Some are merely amusing, but others have fueled wars, inquisitions, and genocides in which millions of people died.

Scientific and technological conspiracies often allege the misuse of science by government, the military, or large corporations, and they include bizarre claims that the military suppressed technology that could make warships invisible, automobile or oil companies possess hidden technology that can turn water into gasoline, and the military is secretly in cahoots with space aliens. Conspiracy theorists have argued that the AIDS virus was deliberately created as part of a plot to kill black or gay people, the 1969 Moon landing was staged in a movie studio, and dentists seek to poison Americans by fluoridating public water supplies. Other theorists claim that corporate officers and public health officials suppress evidence that preservatives in vaccines cause autism and silicone breast implants cause connective-tissue disease (Specter 2009; Wallace 2009).

Conspiracy theories include claims that a major drug company hid reports stating that its leading anti-inflammatory drug caused heart attacks and strokes (Specter 2009) and that environmental scientists have conspired to keep refereed journals from publishing papers by researchers skeptical that global warming is a crisis (Hayward 2009; Revkin 2009). There are many theories about physicians or drug companies conspiring to suppress non-mainstream medical treatments, vitamins, and health foods. One author alleges that big business and the medical establishment conspired to obstruct the search for a cure for AIDS so that they could sell their ineffective drugs and treatments (Nussbaum 1990).

Many of these theories are clearly absurd, but some are plausible and others actually contain elements of truth. How can we distinguish among the amusing eccentrics, the honestly misguided, the avaricious litigants, and the serious skeptics questioning a premature consensus? With scientific claims, the only definitive answer is to reexamine the original research data and repeat

the experiments and analysis. But no one has the time or the expertise to examine the original research literature on every topic, let alone repeat the research. As such, it is important to have some guidelines for deciding which theories are plausible enough to merit serious examination.

One valuable guideline is to look for cascade logic in conspiracy arguments (Susstein and Vermeule 2008). This occurs when defenders of a conspiracy theory find it necessary to implicate more and more people whose failure to discover or reveal the conspiracy can be explained only by their alleged complicity. Another guideline is to look for exaggerated claims about the power of the conspirators, claims that are needed to explain how they were able to intimidate so many people and cover their tracks so well. The more vast and powerful the alleged conspiracy, the less likely that it could have remained undiscovered.

For example, the claim that the Moon landing in 1969 was a hoax implies the complicity of thousands of American scientists and technicians, as well as that of Soviet astronomers and others around the world who tracked the event. It is incredibly implausible that such a conspiracy could have held together. On the other hand, the theory that a few individuals in Richard Nixon's campaign conspired to break into their opponents' offices in the Watergate building was plausible and proved worth investigating. Similarly, the theory that a group of climate scientists conspired to suppress research that they believed to be misleading and harmful to public policy is plausible and worth investigating, despite the small likelihood that such a conspiracy would remain undetected for long.

Definition of 'Conspiracy'

The conspiracy meme works because conspiracies do exist in the real world. Claims of conspiracy cannot be reflexively dismissed, but they are difficult to test because lack of evidence can be interpreted as proof of how cleverly the conspirators have hidden it. The first step in testing claims of conspiracy is to establish precisely what is being claimed. There is no single accepted definition of "conspiracy," and people apply the term differently depending on their point of view. The *Oxford English Dictionary* defines a conspiracy quite loosely as "an agreement between two or more persons to do something criminal, illegal, or reprehensible." There are legal definitions of criminal conspiracy, but whether something is "reprehensible" is in the eye of the beholder. When Hillary Clinton protested that her husband was the victim of a "vast right-wing conspiracy" and Lyndon Johnson accused the media and liberal activists of a "conspiracy" to oppose his Vietnam War policies, these claimants were intentionally vague as to whether they referred to illegal or merely reprehensible behavior (Kramer and Gavrieli 2005). Any group of people organizing for a cause the speaker does not like may be denounced as "conspirators."

But the word *conspiracy* also usually implies something that is secret and hidden. Pigden (2006, 20) defines a conspiracy as "a secret plan on the part of a group to influence events in part by covert action." Conspiracies so defined certainly do take place, and it may be that the most successful ones are never discovered. They include the (failed) conspiracy to assassinate Adolph Hitler; the September 11, 2001, terrorist attacks; and the Watergate conspiracy. But the term "conspiracy theory" usually refers to claims that important events have been caused by conspiracies that have heretofore remained undiscovered (Coady 2006). The claim that the World Trade Center was bombed by al-Qaeda would not be a conspiracy theory in this sense, but the claim that it was bombed by Israeli agents or that American authorities knew about it in advance would be. There is no chance of getting agreement on an "official" definition, but people alleging conspiracy should be challenged to be clear about their meaning.

The conspiracy meme flourishes best in politics, religion, and journalism, where practitioners can succeed by attracting followers from the general public. It isn't essential that practitioners actually believe the theory; they may just find it plausible and useful to raise doubts and discredit their competitors. But this strategy should not be enough for scientists. Scientific findings are just that—findings, not speculations about undiscovered goings-on. These findings must be replicable by other scientists.

In their routine work, scientists have little use for the conspiracy meme because success in scientific careers comes from winning grant applications and

It isn't essential that practitioners actually believe the theory; they may just find it plausible and useful to raise doubts and discredit their competitors.

publishing significant findings in peer-reviewed journals. Attacking other scientists as conspirators would not be helpful for most scientists' careers, however frustrated they may be with referees, editors, colleagues, or administrators who turn down their manuscripts or grant proposals or deny them tenured jobs. But the conspiracy meme may be useful for scientists who are so far out of the mainstream in their field that they seek to appeal to alternative funding sources or publication outlets. The conspiracy meme also occasionally surfaces when a scientist's mental health deteriorates to the point that he or she loses touch with reality.

Trial lawyers, on the other hand, have a great deal of use for the conspiracy meme because they succeed by convincing juries. It is part of the standard repertoire of memes they use to discredit evidence offered by "experts" of all kinds, including scientists. Lawyers focus on the motivations of the experts, on who hired them, on what they are being paid for their testimony, and so on. They also seek out an "expert" who will testify on their side, implying that expertise is for sale to the highest bidder and that opinion is divided on the issue in question. The rewards can be very great if a class-action lawsuit results in a settlement against a wealthy corporation.

Vaccine Conspiracies

Conspiracy theories about vaccines were given a tremendous boost when the esteemed medical journal the *Lancet* published a study reporting a hypothesized link between the measles-mumps-rubella (MMR) vaccine and autism (Burgess et al. 2006). The media highlighted the story despite the study's very small sample size and speculative causal inferences, and the public reaction was much larger than medical and public health authorities anticipated. Reasons for the public reaction included resentment of pressure on parents, distrust of medical authorities, and the potentially catastrophic nature of possible risk to a vulnerable population. There was also the potential for large class-action settlements in favor of parents who believed their children were injured by the vaccines, some of whom desperately needed help to care for autistic children.

The result was a decline in the proportion of parents having their children vaccinated and a subsequent increase in disease, especially in the United Kingdom. The authorities responded by citing findings from large epidemiologic studies, but much of the press coverage highlighted anecdotal accounts and human-interest stories. Recovery of public confidence in vaccination may be due more to revelations of conflicts of interest on the part of the physician who published the original article—which was eventually withdrawn by the journal—than to the overwhelming evidence for the lack of a relationship between vaccination and autism rates.

Conspiracy theorists typically overlook lapses in logic and evidence by their supporters, but they are quick to pounce on any flaw on the part of their opponents. When a leading Danish vaccine researcher was accused of stealing funds from his university, the vac-

Dissenters from mainstream science often invoke the meme that there are two sides to every question and each side is entitled to equal time to present its case.

cine conspiracy theorists pounced. Robert F. Kennedy, Jr., son of a former U.S. Attorney General, used the occasion to denounce the "vaccine cover-up" on the influential blog *Huffington Post* (Kennedy 2010). He explained away the research findings on vaccines and autism on the grounds that there had been a change in the Danish law and the opening of a new autism clinic. He criticized vaccine researchers for receiving money from the Centers for Disease Control and Prevention (CDC) for their studies and for "being in cahoots with CDC officials intent on fraudulently cherry-picking facts to prove vaccine safety." But if the CDC had not funded this research, largely in response to popular concerns, vaccine opponents would have denounced it for not doing so.

Genetically Modified Food Conspiracies

Public alarm about GM foods was aroused when a scientist, Árpád Pusztai, claimed in a television interview that rats had suffered intestinal damage due to eating GM potatoes ("Genetically modified" 2010; Enserink 1999). The finding was clearly preliminary; there were only six rats in each of two groups, and one group was fed GM potatoes for only ten days. The reported effects on the rats were minor, but the study received tremendous publicity because it fed into fears that had long been cultivated by environmentalist and anti-capitalist social movements. As the controversy progressed, questions were raised about the integrity of the study, leading Pusztai to leave his research institute. But anti-GM activists denounced criticisms of the research as a conspiracy and circulated a petition among scientists supporting Pusztai's rights. Finally, the *Lancet* published his study, which had not yet appeared in a refereed journal. They sent it to six reviewers, only one of whom opposed publication. But one of the reviewers who favored publication said he "deemed the study flawed but favored publication to avoid suspicions of a conspiracy against Pusztai and to give colleagues a chance to see the data for themselves" (Enserink 1999).

By releasing his findings on television, Pusztai received extraordinary attention for a study that otherwise might never have been accepted by a leading scientific journal. At least, that was the opinion of the editor of a competing journal who asked "when was the last time [the *Lancet*] published a rat study that was uninterpretable? This is really lowering the bar" (Enserink 1999). Releasing controversial findings on the Internet or through press releases is justified as a way of making important discoveries available quickly, but it also serves to circumvent the normal scientific review process. Sometimes these "findings," such as the claim that the decline in crime in the United States in the 1990s was due to the legalization of abortion in the 1970s, become part of the conventional wisdom before other scientists have a chance to debunk them (Zimring 2006).

The Fair Debate Meme

Dissenters from mainstream science often invoke the meme that there are two sides to every question and each side is entitled to equal time to present its case. George W. Bush famously suggested that students be taught both evolution and creationism so that they can judge which has the most convincing argument. Similarly, holocaust deniers demand equal time for their side of the argument, and they might travel to Tehran or wherever they can find a receptive audience. If these dissenters, or "revisionists," succeed in getting an opportunity to present their case, they will hammer away at any gaps or contradictions in the evidence presented by mainstream researchers, using rhetoric that questions their opponents' motivations while avoiding any hint of weakness or bias in their own case.

This advocacy meme is widely used in law courts and political debates, and it can work well when the question at hand is one of taste or morality. It doesn't work well for scientists because there are objectively right and wrong answers to most scientific questions—they can't be resolved by votes of schoolchildren. Schoolchildren in 1945 might have agreed with U.S. Admiral William Leahy's famous statement that "the [atomic] bomb will never go off, and I speak as an expert on explosives." But once the bomb went off, there were no longer two sides to the question.

The Scientific Expertise Meme

In deciding to pursue the atomic bomb project, President Harry Truman relied on another meme that is very powerful in western societies, that of reliance on scientific expertise. Decision makers and the general public are most likely to be persuaded by this meme when scientists are in agreement and when their advice and policy prescriptions have a good track record. There is an

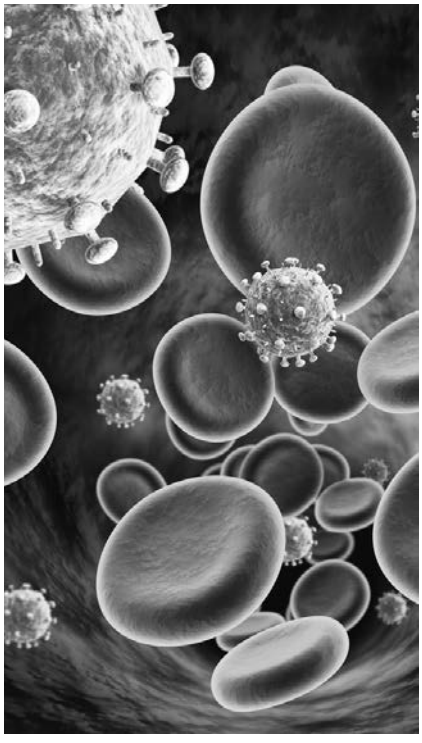
inherent tension between the policy makers' desire for consensus and the scientists' need to remain open to alternative theories and evidence. Scientists who wish to influence policy may be tempted to claim a scientific consensus when the facts do not yet warrant one.

We social scientists have forfeited much of our potential influence because we are too often perceived as advocates for a cause rather than as objective researchers. Our ability to predict policy outcomes is very limited, yet we sometimes fall into the trap of claiming to know more than we do. Econometricians have been publishing conflicting analyses of the relationship between capital punishment and homicide rates for decades without making any real progress, yet they continue to use their findings to advocate for or against capital punishment (Goertzel and Goertzel 2008). When President Bill Clinton proposed welfare reform in the United States, social scientists specializing in the topic almost universally predicted that a disastrous increase in poverty and hunger would result. In some cases they defended their predictions with elaborate statistical models, despite the fact that these models had no demonstrated track record for predicting trends in poverty (Goertzel 1998). President Clinton deferred to politicians and conservative activists who predicted that poverty and dependency would decline as, in fact, they did.

Memes Collide: HIV/AIDS Deniers

The conflict between the fair debate meme and the scientific expertise meme was pronounced in the dispute between the late *Nature* editor John Maddox and biologist Peter Duesberg, who opposes the theory that HIV causes AIDS. Relying on the norms of fairness in debate, Duesberg (1995) sought the right to reply to scientific papers that defend mainstream views about the HIV-AIDS connection. At a certain point in the debate, Maddox refused to continue to give Duesberg "the right of reply," arguing that Duesberg had "forfeited the right to expect answers by his rhetorical technique. Questions left unanswered for more than about ten minutes he takes as further proof that HIV is not the cause of AIDS. Evidence that contradicts his alternative drug hypothesis on the other hand is brushed aside." Maddox argued that Duesberg was not asking legitimate scientific questions but rather making demands and implying, "Unless you can answer this, and right now, your belief that HIV causes AIDS is wrong" (Maddox 1993).

Maddox observed that "Duesberg will not be alone in protesting that this is merely a recipe for suppressing challenges to received wisdom. So it can be. But *Nature* will not so use it. Instead, what Duesberg continues to say about the causation of AIDS will be reported in the general interest. When he offers a text for publication that can be authenticated, it will if possible be published." As an editor of a scientific journal, Maddox was justified in saying that he would publish papers that offered new findings, not ones that just picked at unanswered questions in other people's work. But



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Maddox was realistic in realizing that his refusal to publish additional comments by Duesberg would be portrayed as censorship by believers in the AIDS conspiracy theory.

The Resistance to Orthodoxy Meme

Duesberg and other dissenters also rely on another well-established rhetorical meme, that of the courageous independent scientist resisting orthodoxy. This meme is frequently introduced with the example of Galileo's defense of the heliocentric model of the solar system against the orthodoxy of the Catholic Church. And there are other cases of dissenting scientists who have later been proven right. Thomas Gold (1989) reports confronting the "herd mentality" of science when advancing his theories on the mechanisms of the inner ear and the nature of pulsars as rotating neutron stars, both of which later came to be accepted. This "herd mentality" is not the product of a deliberate conspiracy, although it may be perceived as one. It is a collective behavior phenomenon: a belief is reinforced and becomes part of the conventional wisdom because it is repeated so often. This is why those who offer differing views are important. Being a dissenter from orthodoxy isn't so difficult; the hard part is actually having a better theory than the conventional one. Dissenting theories should be published if they are backed by plausible evidence, but this does not mean giving critics "equal time" to dissent from every finding by a mainstream scientist.

In his response to Duesberg, Maddox refers to the philosophical argument, associated with Karl Popper, that science progresses through falsification of hypotheses. Maddox says, "True, good theories (*pace* Popper) are falsifiable theories, and a single falsification will bring a good theory crashing down." But he goes on in the next sentence to implicitly rely on a different philosophy of science, often associated with the work of Imre Lakatos, which is that science normally progresses by correcting and adding to ongoing research programs, not by abandoning them every time a hypothesis fails. Maddox says, "Unanswered questions are not falsifications; rather, they should be the stimulants of further research."

Scientists do change their ideas in response to new evidence, perhaps more often than people in most walks of life. Linus Pauling abandoned his triple-helix model of DNA as soon as he saw the evidence for the double-helix model. But he never abandoned his advocacy of vitamin C as a treatment for the common cold and cancer, no matter how many studies failed to show a significant difference between experimental and control groups. Pauling found flaws in each study's research design and insisted that the results would be different if only the study were done differently. He never did any empirical research on vitamin C himself, research that would have risked failing to confirm his hypotheses. He instead limited himself to debunking published scientific studies. Unfortunately, Pauling is probably better known by the general public for this work than for his undisputed and fundamental contributions to chemistry. Pauling did not claim that he was the victim of a conspiracy; he saw himself as challenging the herd mentality of science. But his scientific prestige lent credibility to those who sought to discredit scientific medicine as a conspiracy of doctors and drug companies (Goertzel and Goertzel 1995). Scientific expertise is usually quite specialized, and scientists who advocate for political causes only tangentially related to their area of specialization have no special claim on the truth.

Conspiracy theorists often seem to believe that they can prove a scientific theory wrong by finding even a minor flaw or gap in the evidence for it. Then they claim conspiracy when scientists endeavor to fix the flaw or fill the gap. If the scientists persist in their work, on the assumption that a solution will be found, they are again charged with conspiracy. In fact, the occasions when an entire scientific theory is overthrown by a negative finding are few and far between. This is especially true in fields depending on statistical modeling of complex phenomena for which there are often multiple models that are roughly equally good (or bad), and the choice of a data set and decisions about data-set filtering are often critical. The more important test of a research program is whether progress is being made over a period of time and whether better progress could be made with an alternative approach. Progress can be measured by the accumulation of a solid, verifiable body of knowledge with a very high probability of being correct (Franklin 2009).

Climate Change Conspiracy

The conspiracy meme has been especially prominent in the debate about global warming. When the Intergovernmental Panel on Climate Change published its report in 1996, an eminent retired physicist, Frederick Seitz (1996), accused it of a "major deception on global warming" on the op-ed pages of the *Wall Street Journal*. Seitz did not offer a scientific argument that the report's conclusions were wrong. Instead, he attacked the committee's procedure in editing its document, accusing the editors of violating their own rules by rewording and rearranging parts of the text to obscure the views of skeptical scientists. This seemingly obscure point about the editing of a UN technical document proved remarkably effective in providing a rallying point for opponents of the report's conclusions.

A careful review of the incident (Lahsen 1999) concluded that the editors did not violate any of their own rules and that the editorial changes were reasonable. Editors, after all, do edit texts, all the more so when the texts are written by a committee. The skeptical arguments were not deleted from the report, but they were repositioned and rephrased, perhaps giving them less emphasis than Seitz thought they deserved. But the conspiracy meme was successful in shifting much of the public debate from the substance of the issue to criticism of personalities, procedures, and motivations. The climate scientists felt attacked and apparently began to think of themselves more as activists under siege than as neutral scientists. In 2009, computer hackers released private e-mails apparently showing that some climate scientists had pressured editors not to publish papers by skeptics and that the climate scientists had looked for ways to present their data to reinforce their advocacy views (Revkin 2009; Hayward 2009; Broder 2010).

Climate science is heavily dependent on complex statistical models based on limited data, so it is not surprising that models based on different assumptions give differing results (Schmidt and Amman 2005). In presenting their data, some scientists were too quick to smooth trends into a "hockey stick" model that fit with their advocacy concerns. Several different groups of well-qualified specialists have now been over the data carefully, and the result is a less linear "hockey stick," with a rise in temperature during a medieval warm period and a drop during a little ice age. But the sharp increase in warming in the twentieth century, which is the main point of the analysis, is still there ("Hockey stick controversy" 2010; Brumfiel 2006).

This is not the place to review the substance of the issue, which has already been debated extensively in this journal. An encouraging thing, however, is that despite the bitterness is the debate about scientists' behavior, there is considerable consensus on the issue of global warming itself. One of the responsible critics, for example, frankly states that "climate change is a genuine phenomenon, and there is a nontrivial risk of major consequences in the future" (Hayward 2009). But there is no consensus on how high the risk is, how quickly it is likely to materialize, or the costs and benefits of strategies needed to counter it.

The less responsible critics simply dismiss the issue as a hoax and focus exclusively on the peccadilloes of the other side. The climate scientists gave the conspiracy theorists an opening by letting their advocacy color their science, which compromised the legitimacy of their enterprise and, ironically, weakened the political movement itself. This is especially unfortunate because the underlying science is fundamentally correct.

Conspiracy Consequences

Faced with assaults on their professional credibility, scientists may be tempted to retreat from the world of public policy. But allowing the conspiracy theorists to dominate the public debate can have tragic consequences. Fear of science and belief in conspiracies has led British parents to expose their children to life-threatening diseases, the South African health department to reject retroviral treatment for AIDS, and the Zambian government to refuse GM food from the United States in the midst of a famine. Fear of science is not new. Ben-

Fear of science is not new. Benjamin Franklin was afraid to vaccinate his family against smallpox and regretted it deeply when a son died of the disease in 1736. Parents are making the same mistake today.

jamin Franklin was afraid to vaccinate his family against smallpox and regretted it deeply when a son died of the disease in 1736. Parents are making the same mistake today.

Advocacy groups sometimes find it easier to arouse fears of science than to advocate for other goals that may actually be more fundamental to their concerns. The movement against GM foodstuffs in Europe was mobilized largely by anti-capitalist, anti-corporate, and anti-American activists who found it more effective than attacking corporate capitalism directly (Purdue 2000; Schurman 2004). These ideologies have much less support in North America, and efforts to organize against GM food here were much weaker. North Americans have suffered no significant ill effects from the integration of these foods into their diet, a fact that Greenpeace and other advocacy groups studiously ignore. One suspects that if GM seeds had been invented by a socialist government, these advocacy groups would have heralded them as a great victory in the war against hunger.

Public policy requires reaching consensus to make decisions, even though some uncertainty usually remains. If scientists cannot do this, surely it is too much to expect politicians or journalists to do it. Efforts to define a consensus are vulnerable to attacks by conspiracy theorists who portray a consensus as a mechanism for suppressing dissent and debate. But there will always be dissenters, and at a certain point arguing with them becomes unproductive. In 1870, Alfred Russell Wallace allowed himself to be drawn into an extended conflict with Flat Earth theorist John Hampden, editor of the *Truth-Seeker's Oracle and Scriptural Science Review*. Their dispute over whether the Earth is round involved measuring the curvature of the water on the Old Bedford Canal in England. There was a public wager, which Wallace won, followed by a lawsuit when Hampden refused to pay, a threat against Wallace's life, and a prison term for Hampden. Hampden and his followers were never convinced the Earth is not flat, and belief in the "round Earth conspiracy" apparently persists to this day (Garwood 2008; O'Neill 2008).

Scientists will never reach a consensus with Flat Earthers or with those who believe the Earth was created in 4004 BCE. Nor do they need to. The best that science can provide is a clearly specified degree of consensus among scientists who base their conclusions on empirical data. Efforts to reach consensus on important questions have been discouraged due to the influence of philosophers of science who emphasize conflicting research programs, paradigm shifts, and scientific revolutions (Franklin 2009; Stove 1982). Although these events do occur in the history of science, they are exceptional. Most sciences, most of the time, progress with an orderly, gradual accumulation of knowledge that is recognized and accepted by specialists in the field. Opposition rooted in religious or ideological concerns is acceptable as part of the democratic political process, but it need not prevent scientists from reaching a consensus when one is justified.

Peer Review

The peer review process in scientific journals plays a central role in determining which research findings deserve to be incorporated in the scientific consensus on an issue. As such, this process is a target for conspiracy theorists. Peer reviewers are usually anonymous, which suggests they may have something to hide. Although authors' names are usually removed from studies to be reviewed, reviewers are specialists in the same field and can often guess who the authors are. Reviewers are not in a good position to detect actual fraud; they can't redo the experiments or the data analysis. And they may reject papers that go against the conventional wisdom or political consensus in their field (Franklin 2009, 205–11). No adequate alternative to peer review has been proposed, but initiatives to make the review process more transparent may help, including making reviewers' comments and the original data sets available on the Internet.

The credibility of peer review has been undermined in the recent dispute over global warming because the reviewers are drawn from a fairly small pool of specialists who are known to have a policy agenda. The appointment of panels of distinguished scientists to review the body of research in the field is an excellent step to rebuilding credibility (Broder 2010). The review panels must have full access to all the data sets, as well as the time and expertise to conduct their own analyses if necessary—which cannot normally be expected of volunteer reviewers for a journal. It is important that these reviewers give qualified specialists an opportunity to present alternative views, as long as these views are based on scientific analysis of appropriate data and not just polemical criticism. No matter how well they do their work, however, these panels are likely to be attacked by conspiracy theorists.

If the blue-ribbon scientific commissions confirm the original research findings, perhaps with only modest caveats, many people will be convinced. But individuals with strong feelings about the issue may resort to cascade logic, suspecting that the review panel is also part of the conspiracy. Cascade logic can easily develop into a generalized distrust of anything that comes from a mainstream or elite source. In the past, social psychological studies found that this kind of generalized belief in conspiracies was most common among people who were discontented with the established institutions and elite groups in their society, believed that conditions were worsening for people like themselves, and believed that authorities did not care about them (Goertzel 1994; Kramer 1998).

The conspiracy meme can convert a dry scientific issue into a human drama in which malefactors can be exposed and denounced. Scientists are not trained in dealing with this kind of de-

bate, and there is no reason to expect them to be especially good at it. If they also have strong feelings about the issues, they may fall into the conspiracy meme themselves. But when scientists succumb to the temptation to "fight fire with fire," they risk losing their credibility as experts. It may be tempting to exaggerate findings in mass media outlets by using graphics that highlight the most extreme possibilities. This may be effective in the short run, but the public feels deceived when today's newest scare is refuted by tomorrow's press release; their belief in science is diminished. In today's political climate, scientists need to be careful about releasing their findings on controversial issues; they must make sure the findings have been thoroughly reviewed and that the data sets are available for others to analyze.

Political decisions will inevitably reflect economic interests and emotional concerns that conflict with what scientists believe is best. But scientists can be more effective if they avoid using the conspiracy meme and other rhetorical devices and instead clearly separate their scientific work from their political advocacy as citizens. ■

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The Aura

A Brief Review

Empirical studies show no evidence for the existence of an aura around humans that supposedly only psychics can see. Why, then, does belief in auras persist?

BRIDGETTE M. PEREZ and TERENCE HINES

"I used equipment he invented as well as adaptations made of Dr. Walter J. Kilner's screens for some years before I discovered that my eyes could see auras without visual aids." —J.C. Pierrakos (2005)

One might feel compelled to reread the above quote because, after all, there is presently no objective evidence for the existence of auras. The word *aura* itself comes from a Greek word meaning *breeze*. The aura is claimed to be a glowing field surrounding a human being that is undetectable, except by gifted psychics. By interpreting the aura of an individual, one is said to be able to deduce personality, health, and present emotions (Randi 1995).

Believers in the aura describe it as a "vital force [that] spills beyond the perimeters of the skin into the atmosphere to create an energy field, or aura, which provides a great deal of information about the nature and functioning of human beings" (Pierrakos 2005, 18). Many methods have been used to test whether the aura exists. One method has been to test gifted individuals who claim to see auras. Attempts have also been made to look for auras with the aid of various instruments and apparatus. The great majority of these tests, which we review here, have shown limited or no evidence for the reality of auras. In spite of the lack of empirical evidence, proponents continue to advocate their existence. In the second part of this article we will discuss several explanations for proponents' continued belief in spite of the lack of evidence.

Empirical Studies of Auras

An obvious method for testing the existence of auras is to test psychics who claim to be able to detect them. In one such experiment, a windowless television studio with a barrier in the center and entrances at each end was used (Loftin 1990). A psychic and an experimenter stood on one side of the barrier while one or two subjects entered the studio on the other side. The psychic had less than three minutes to discern how many auras she detected. Two white-noise generators were used to cover any subtle sound cues, such as the sound of breathing, that might give away how many subjects were present in the room. Not surprisingly, the psychic did not score above chance.

Another experiment had a more elegant methodology (Gissurarsson and Gunnarsson 1997). It took place in a room that contained four screens made from unpainted fiberboards, which were placed in a row on one wall of the room. In this experiment, unlike in the one previously described, a control group was used. Ten aura seers and nine non-seers (the control group) were selected to participate in the experiment. All of the participants had to guess behind which one of the four screens the experimenter was hidden. This task was based on the assumption that the aura radiates a few inches from the body and should have been visible above the screen. Blinds covered the large windows on the wall behind the screens, and the whole wall was covered with brown paper. Suggestive shadows were eliminated through the use of Luxo lamps positioned across from the screens. A total of thirty-six sessions consisting of 1,449 trials was run. The results were non-significant for both groups, although "the control group did slightly better than the experimental group" (Gissurarsson and Gunnarsson 1997, 41).

Attempts have been made to measure the aura objectively and experimentally. Various instruments have been used or even invented for the purpose of observing the aura. In the early 1900s, W.J. Kilner thought that the aura could be made visible through the use of dicyanin screens containing a coal-tar dye. The dye appeared to alter the sensitivity of the eye by "making the observer temporarily short-sighted and therefore more readily able to perceive radiation in the ultra-violet band" (Kilner 1965, viii). Kilner studied the human aura for diagnostic purposes and made an explicit disclaimer of any clairvoyant or occult preoccupation. Ironically, the spiritualist movement quickly endorsed Kilner's findings as proof of existence of the aura. Shortly thereafter, aura spectacles and aura goggles were invented, based on the idea of the dicyanin screens (Gissurarsson and Gunnarsson 1997).

Existing instruments have also been used to attempt to quantitatively measure the radiation that an aura supposedly emits. A photomultiplier tube, a highly sensitive device, has been used to try to detect this radiation (Dobrin et al. 1977). The photomultiplier responds to small quantities of light by producing measurable amounts of electric charge. The amount of charge produced is proportional to the amount of light detected by the tube. This tube responds to light in the visible and ultraviolet range but not in the infrared range, which rules out heat effects. This experiment demonstrated that humans do reflect energy in the visible and ultraviolet spectrum, but this is not surprising. If the human body did *not* reflect energy in the visible range, it would be invisible.

Kirlian photography has also been used in the attempted examination of auras. A Kirlian photographic image of an object is obtained when a large electric potential is applied between the object and a dielectrically isolated electrode (Pehek et al. 1976). A famous instance in which Kirlian photography seemed to prove the reality of the aura happened when a section of a plant leaf was photographed and then torn away. The leaf was then rephotographed, which resulted in a faint image of the torn-out section still appearing in the second photo (Randi 1995). The luminous low-current gaseous discharge, known as a *corona discharge*—resulting from variance in pressure, humidity, grounding, and conductivity surrounding the leaf—persisted temporarily after the torn part was removed and was responsible for the Kirlian image of a complete leaf (Pehek et al. 1976).

Continued Belief in Auras

Seeing auras is actually one of the less common psychic experiences. Zingrone, Alvarado, and Agee concluded, based on a review of studies of the general population, that the "prevalence [of seeing auras] ranged from 0% to 6%" (2009, 161).

The *aura imagery model* suggests that individuals who claim to see auras might actually be perceiving a person through their senses while their mind and memory reinterpret this information as the experience of luminous beings.

One explanation for the persistence of belief in auras, given that there is essentially no objective evidence for their reality, could be rare cases of synesthesia. Synesthesia is a nonpathological neurological condition in which sensory experiences that are usually separate are experienced together. The most common type is color–number/letter synesthesia, in which the synesthete perceives numbers and letters in color (Spector and Maurer 2009). In a rarer type, colors are associated with faces. Ward (2004) reported a case study of G.W., a synesthete who experienced a color for names of people whom she knew personally. She reported that she perceived colors occupying her whole field of vision when her synesthesia was elicited by words. G.W. distinctly visually perceived the names

and faces of people she knew with colored halos or "auras" projected around the person or name. "G.W. does not believe that she has mystical powers and has no interest in the occult. However, it is not hard to imagine how, in a different age, such an interpretation could arise" (Ward 2004, 770). There are other case studies in which synesthetes report projecting colors onto people (Riggs and Karwoski 1934; Collin 1929; Cytowic 1989; Weiss et al. 2001; Ramachandran and Hubbard 2001 as cited in Ward 2004). It is especially interesting that in two separate samples, Zingrone, Alvarado, and Agee (2009) found that individuals who reported seeing auras were significantly more likely to report synesthetic events.

There are other explanations why belief in the existence of auras might persist. Perceptual distortions, illusions, and hallucinations might promote belief in auras. Physiological processes, such as rare cases of human luminescence caused by bacterial infections, might also be responsible for some reports of auras (Alvarado 1987). Psychological factors, including absorption, fantasy proneness, vividness of visual imagery, and after-images, might also be responsible for the phenomena of the aura. Gissurarsson and Gunnarsson (1997) discuss four classes, or models, of possible explanations: *scientific*, *clinical*, *psychical*, and *aura imagery*. In the *scientific model*, for example, an individual might experience visions of a series of colored halos surrounding another person's head. This phenomenon is known as "the glory" and usually occurs outdoors under certain meteorological conditions when a shadow is projected on a cloud of uniform water droplets. In the *clinical model*, seeing an aura might be related to epilepsy. Although epileptic auras are usually olfactory or emotional, visual auras also have been reported. Migraine headaches commonly result in visual phenomena that could easily be interpreted as auras (Sacks 1985). Eye disorders might also account for aura-like experiences. According to the *psychical model*, auras might be attributed to unknown electromagnetic field radiation energy that somehow is visible to only some individuals. This seems highly unlikely. The *aura imagery model* suggests that individuals who claim to see auras might actually be perceiving a person through their senses while their mind and memory reinterpret this information as the experience of luminous beings.

Psychological factors positively related to claims of psychic experiences might also contribute to the belief in the phenomenon of the aura (Zingrone et al. 2009). One study (Alvarado and Zingrone 1994) reported that aura vision was related to higher levels of reports of vividness of visual imagery and of imaginative-fantasy experiences. In another study, a positive relationship between auras and the claims of other psychic experiences was found (Zingrone et al. 2009). Seeing auras has been associated more with aspects of absorption and less with aspects of dissociative processes. *Absorption* was described as "a predisposition towards the processing of unusual perceptual input or of imagery" (Zingrone et al. 2009, 163). These authors also found that people reporting seeing auras were also more likely to report precognitive dreams, lucid and more vivid dreams, and out-of-body experiences.

Psychological factors, such as fantasy proneness, suggestibility, and the like, are related to levels of dopamine activity in the brain (see Raz et al. 2008 for a brief review). Catechol-O-methyltransferase (COMT) is an enzyme that breaks down dopamine in the brain. It has been found that which allele of the COMT gene an individual has is related to the degree of his or her suggestibility and hypnotizability (Raz 2007). Thus, propensity to see auras may have, at least in part, both a neurochemical and a genetic basis.

In summary, although there is ample evidence that human beings are surrounded by thermal, electromagnetic, and electrostatic fields (Presman 1970 as cited in Dobrin et al. 1977), there is a lack of evidence for the existence of the aura that psychics claim to see. Continued belief in the reality of auras can be attributed to several psychological, neurological, and optical effects. ■

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Defending Isagenix

A Case Study in Flawed Thinking

Do those who comment on blogs even read the articles they are responding to? Here is a case study in emotional thinking, *ad hominem* arguments, logical fallacies, irrationality, and misinformation.

HARRIET HALL

The Internet is a wonderful medium for communicating ideas and information in a rapid, interactive way. Many online articles are followed by a section for comments. Like so many things in this imperfect world, comments are a mixed blessing. They can enhance the article by correcting errors, adding further information, or contributing useful thoughts to a productive discussion. But all too often the comments section consists of emotional outbursts, unwarranted personal attacks on the author, logical fallacies, and misinformation. It provides irrational and ignorant people with a soapbox from which to promote prejudices and false information.

To illustrate, let's look at some responses to a piece I wrote about a weight-loss product called Isagenix, which is sold through a multilevel marketing (MLM) scheme. To quote its website verbatim, "The Isagenix cleanse is unique because it not only removes impurities at the cellular level, it builds the body up with incredible nutrition. Besides detoxing the body, Isagenix teaches people a wonderful lesson that they don't need to eat as much as they are accustom [*sic*] to and eating healthy choices are really important and also a lot of the food we are eating is nutritionally bankrupt."

I didn't set out to write this article. It started when I received an e-mail inquiry about Isagenix. I posted my answer on a discussion list, and it was picked up and published at http://healthfraudoz.blogspot.com/2006/11/critique-of-isagenix.html. Sandy Szwarc, author of a blog titled *Junkfood Science*, approved of it and kindly reposted it (see http://junkfoodscience.blogspot.com/2006/11/can-you-really-cleanse-your-way-to.html).

As I write, the comments on the healthfraudoz website have reached a total of 176. A few commenters approved of what I wrote, but the majority tried to defend Isagenix. Their defense was irrational, incompetent, and sometimes amusing.

It was as if no one had actually read what I wrote. No one bothered to address any of my specific criticisms. No one even tried to defend Isagenix's false claims that toxicity accounts for most disease, that the body protects itself from toxins by coating them with fat, and that internal organs become clogged and deteriorate if you don't cleanse. No one offered any evidence that "detoxification" improves human health. No one tried to identify any of the alleged toxins or show that they are actually removed. No one tried to provide any rationale for the particular combination of ingredients (all 242 of them!) in Isagenix products. No one questioned my assertion that "no caffeine added" is inaccurate labeling because green tea, which is added, contains caffeine. No one commented when I observed that the amount of vitamin A in these products is dangerous and goes against the recommendations of the *Medical Letter*. No one offered any evidence that more weight is lost by adding Isagenix to a low-calorie diet and exercise. I offered some alternative explanations that might account for people believing that Isagenix is effective when it isn't; no one commented on that.

The medical advisor on the Isagenix website argued that at five dollars per day, Isagenix is less expensive than open-heart surgery. I pointed out that this is a laughable false dichotomy: good health is not a matter of choosing between open-heart surgery and diet supplements. No one commented on that. Instead of rational responses, we got:

Testimonials

The greatest number of comments were testimonials: "I took it and I lost weight." People claimed not just weight loss but a variety of improvements. Isagenix allegedly cured fibromyalgia, osteoarthritis, and hemorrhoids. It facilitated getting off sleeping pills and caffeine, balanced brain chemistry (what does that mean?), improved focus and mental clarity, allowed running longer marathons with less fatigue, saved a failing marriage, stopped irritability and crankiness, and kept an arm from getting sore after pitching.

"Made my son interact appropriately with peers, take care of himself, and want to be hugged and kissed," claimed one.

"I made money selling it," said another.

One person wrote, "My out-of-control Irritable Bowel Syndrome disappeared and I had the healthiest BM in about 6 years! . . . You can't brainwash POO!!"

Two people commented that the Isagenix program provides motivation; one said he needs "structer" (structure?) to stay on a diet.

The plural of *anecdote* is not *data*. Two commenters appropriately objected to all this testimonial evidence. They pointed out that testimonials are unreliable and subject to *post hoc ergo propter hoc* error, that all the "it works for me" comments can be attributed to a low-calorie diet and exercise, and that the testimonials are almost exclusively from people who are selling the product.

Anti-Testimonials

Quite a few commenters reported that they had tried Isagenix and it either didn't work or caused side effects, such as five days of violent diarrhea. One reported gaining a lot of weight while taking it; many reported losing weight just as well without it. Several reported credit-card disputes with the company and failure to get their money refunded. One reported that his parents are using Isagenix and it seems to be slowly killing them: they have decreased energy, declining health, mood swings, and poorer control of diabetes.

Rebuttals to Negative Testimonials

Supposedly the people Isagenix hasn't helped haven't been following the program correctly. Apparent bad reactions are just signs that it is working: "When one is cleansing out years of accumulation of toxins, chemicals, jet fuel, gasoline, arsenic, heavy metals, radiation poisoning—one will have reactions."

'Evidence' That It Works

One commenter heard a doctor speak who cited all kinds of studies to support the theory behind Isagenix—that Isagenix cleansing can supposedly solve the problems of environmental toxicity, depletion of nutrients in the food supply, gastrointestinal malabsorption, and our incessant food cravings.

Here are some of the other commenters' opinions, a few of which I've replied to in brackets.

A former Hare Krishna was impressed by the array of nutrients in the products and believed that the doctor on the website had integrity and cared about her patients.

Several people claimed that we need nutritional supplements because the ground has been depleted of nutrients.

"There have been many valid scientific research [*sic*] to back the claims of Isagenix." [I couldn't find any, and they provided no clues as to where to look.]

Others claimed that because lots of MDs are recommending Isagenix it must work; these MDs can't all be quacks. [Apparently they can. Lots of MDs recommend homeopathy, and some of them believe in astrology.]

Some commenters pointed out that Isagenix has paid for independent studies. [Where are they? What did they show? If Isagenix was paying, were they truly independent?]

Mainstream physicians are starting to realize cleansing is important, other commenters claimed. [Not any of the ones who practice science-based medicine.]

One commenter proposed that cleansing makes sense because one of

the main ingredients of pesticides and insecticides is estrogen. It makes women fat and casues erectile dysfunction in men. Toxicity is a bigger cause of obesity than most people realize.

Another commenter insisted that because these products are "designed and formulated by professionals and advocated by professionals," they must work.

One MD commenter claimed, "I have the before and after pictures and the lab tests to prove it."

Pseudoscientific claims peppered many comments, such as this one: "Most people only absorb 8% to 12% of what we eat—the rest is waste which we flush down the toilet. With Isagenix we can absorb up to 94% of what is ingested with less waste going down the toilet. Isagenix is full of good probiotics which help rebuild our digestive systems, fights candida. Isagenix also helps the body become alkaline, which is a healthy body. John Hopkins 2008 Cancer Report stated that cancer cannot live in an alkaline body only acidic bodies. Processed food makes our bodies acidic—thus the epedemic [*sic*] of cancer and diabites [*sic*] in the USA along with heart disease." [This is all nonsense.]

Isagenix is food, many commenters insisted. Regular food is from depleted soils. Organic food made children behave better at lunch in a school study. Genetically modified food is lacking in nutrition. "The majority of people fill their stomachs with foods void of natural nutrition and the evidence supports that they behave poorly, learn less, misbehave more and commit more crimes than those who fill their stomachs with highly nutritious organic produce and meats." [Wow! Instead of the Twinkie defense, criminals can claim their non-organic lunch made them do it!]

"Isagenix is a divine blessing in this toxic sick world."

These people apparently expect us to believe unsubstantiated assertions. They have no concept of what constitutes scientific evidence or why controlled studies are needed.

These people apparently expect us to believe unsubstantiated assertions. They have no concept of what constitutes scientific evidence or why controlled studies are needed.

Defense of Multilevel Marketing

"MLM is not a scam, but one of the last bastions of free enterprise." Some commenters claimed that MLM is good because products approved by the Food and Drug Administration (FDA) don't work, and that MLM is "the most legitimate business out in the world today." All corporations are a pyramid anyway, they said.

But one commenter called MLM an "exploitative business model" and pointed out that the average yearly income for Isagenix distributors is only $116.87. Another pointed out that 97 percent of MLM schemes fail.

Personal Attacks on Me

"A Dr Harriet Hall wrote a very funny one sided arguement [*sic*] against [Isagenix] but omitted to inform the world how much money she has made conning patients into taking drugs she should know are harmful to you."

Some commenters thought I was arrogant: "If it were up to know-it-all MDs like Harriet Hall, I'd still be in chronic pain."

"To [*sic*] bad when you look up Dr. Hall in Washington no such person is licensed to practice medicine. Sad day when you have to lie to get people to pay attention to anything you say. . . ." [It took me about one minute to locate verification of my license at https://fortress.wa.gov/doh/providercredentialsearch/SearchResult.aspx.]

One commenter questioned whether I am really a doctor and says I have a small brain and a big mouth.

One claimed I write only to feed my ego.

Another said I shouldn't make comments without doing any research.

One thought I should try it for myself.

Another questioned why I didn't learn more by attending a meeting for the product, interviewing company representatives, or talking to the press.

Some thought instead of writing for the public I should have contacted the doctors at the company and discussed my concerns with them.

"Don't try to convince us, Dr. Hall, that you necessarily have 'the answer.'" [Did I say I did?]

One alleged that I came to a conclusion without any research whatsoever; this is from a doctor who said, "Cleansing is now my first choice for my patients." One wondered what research he did to make that choice.

"Going out of her way to trash Isagenix this way is pathetic."

"PS 'Dr.Hall' your little family practice designation really doesnt buy alot [*sic*] of cred."

"Real doctors don't waste their time sitting on the internet making bogus posts about different health products. . . I could sign as doctor and no one would know."

"This article is and the author is full of crap. I know it and he knows it." [I know I'm not a "he."]

A few commenters…pointed out that no one had actually addressed any of the points I made or offered any evidence that what I wrote was wrong.

Some commenters thought I didn't know anything and I should just shut up.

"This is just another doctor that stands to loose [*sic*] their income by the masses becoming healthy."

"What ever [*sic*] Dr. Harriet Hall is selling, I'm not interested." [For the record, I'm retired and the only thing I'm "selling" is critical thinking.]

Some suggested that just because I went to medical school doesn't mean I'm a smart person.

Kudos

A few commenters offered agreement and praise; they pointed out that no one had actually addressed any of the points I made or offered any evidence that what I wrote was wrong. They reprimanded other commenters for resorting to *ad hominem* attacks.

Attacks on the Medical Profession

Many of the commenters seemed to think that doctors know nothing about nutrition. Doctors just put bandages on problems: they sell pills that mask symptoms and wreak havoc on your body instead of treating underlying causes. They only want to make money. They want to keep people sick so they won't lose their kickbacks. [What kickbacks?] There are lots of malpractice suits.

"Most MD's [*sic*] will not even take the death dealing treatments they inflict upon the rest of the population."

Some commenters claimed that even if evidence showed Isagenix worked, conventional medicine still wouldn't adopt it because of competition from drug companies. Many doctors are typically overweight and/or out of shape. The majority of emergency department doctors are lacking skills in emergency procedures.

One person commented, "MD's [*sic*] keep American's [*sic*] addicted to drugs! MD's also fancy themselves as God like. They think that being an MD allows them to keep American's from seeking nutrition."

"Our medical doctors have failed us," one person lamented.

Another observed: "So sad that people in our medical profession have no idea what they are talking about!!!"

Attacks on Science

Commenters insisted that instead of listening to science, one should listen to one's own body.

Some asked: even if it's only a placebo, why not use it?

Western medicine is trying to "squash Eastern medicine," one commenter believed.

Another warned: "Things work for different people. Chiropractic and acupuncture work. If you ask for everything to be backed by studies, they just tailor the studies to benefit industry. Research things for yourself and don't be a sheep taking pills from an MD."

Two commenters attacked the scientifically impeccable website Quackwatch, asserting that Stephen Barrett is literally funded by Big Pharma, the American Medical Association (AMA), and the FDA to produce disinformation aimed at discrediting alternative medicine. [He has no ties to any of those organizations.]

"See how herbs can treat people, not drugs," one commenter advised.

"Did any of you see *Sicko*? If you did how could you possibly take one physicians [*sic*] 'opinion' about something she didn't even try over the many testimonials."

Some commenters felt they knew better than any doctor: "I choose to observe how my own body feels and reacts to what I ingest."

"If you think its [*sic*] going to help it will," one commenter suggested.

Some put forth that the real answer is to integrate Eastern with Western medicine.

"Oh, and I have found prayer helps me," one Isagenix proponent added.

One commenter tried to turn the tables on me: "I feel it is unfair to say Isagenix is making unsubstantiated claims, and that it doesn't actually help you at all..... isn't that an unsubstantiated claim too?" [I didn't claim that it didn't work; I said there was no evidence that it did, and no reason to think it would.]

Attacks on the FDA and Big Pharma

Many commenters suggested that the FDA disclaimer about Isagenix is meaningless and believe we shouldn't take FDA warnings seriously: "It is a terrorist organization that lies, cheats steals, and intimidates anyone who stands between them and the targets of their wrath."

"Dr Hall if you think the FDA is doing a good job you must love some

of the poison they approve, such as Aspartame."

Some commenters erroneously thought doctors got commissions for prescribing drugs.

One even asserted that a conspiracy of J.D. Rockefeller is behind the pharmaceutical industry and that many prescriptions are made from manipulation of petroleum.

People die from drugs, commenters insisted.

"My doctor wanted me to start beta blockers, after much investigation I decided that I was to [*sic*] young to have my liver contaminated by these pills . . . ."

Many commenters assured us that natural remedies work just as well and are safer than prescriptions.

Several commenters fervently believed that pharmaceuticals are the ultimate money-making scam.

Off-the-Wall False Claims

"The FDA (yes, those great friends of ours) just recently put a new advisement out there that we will soon be required to irradiate ALL raw vegetables and fruits [it certainly did not!]. Do you all know what irradiation does to food? It not only kills 'bad' things like e. coli, but it kills nutrients from your foods as well."

Try It for Yourself

Numerous commenters seemed to think the best way to determine if a treatment works is to try it yourself. But one commenter rightfully pointed out that the try-it-yourself argument is fallacious and condescending: "One does not have to experience snake venom to know to stay away from snakes."

Haven't Tried It But Plan To

Several commenters were planning to try it after reading the article and comments. One of these said he knows firefighters who use it and he "would rather have one of the firefighters doing brain surgery on me, than let the average physician tell me what is going on in my body." [Wow! Does this guy even have a brain?]

It's a Scam

Quite a few people agreed with what I wrote. Several were outspoken in calling Isagenix a scam.

"People would rather rave about this crap than admit that they were fooled into wasting their money."

"Without even considering the science, common sense helped me spot this as bullshit."

"Isagenix is a freakish cult perpetrated on the uncritical, by the unscrupulous, using the desperate search for the ever-elusive 'easy solution.'"

One reported that a cousin and her boyfriend are "making a TON of money selling this stuff to all of you morons stupid enough to buy it and make them rich. ISAGENIX only 'works' for the people selling it. Diet and exercise WORKS for everyone!"

Concerns

A few commenters expressed concerns about the product. One commenter said the Isagenix company representative couldn't answer questions about origin of ingredients and quality control. There have been no controlled studies. Where is the evidence? How do we know it is safe? Long-term results remain to be seen. How many can maintain this restrictive lifestyle for years? Why isn't Isagenix being regulated by the FDA? "I am a little concerned about the way some people discuss this product in almost cult-like fashion. It makes me wonder if there are mind-control drugs in this stuff."

Two Jokes

"I got a refund check from [the] IRS after starting Isagenix."

"I have some magic beans for sale. Try eating right and exercising instead."

Funny, Unhelpful, and Bizarre Comments

"Who cares whether it works or not. This stuff tastes like 9-day old garbage mixed with water from a sewer."

One man took it on the recommendation of his chiropractor; he now distrusts both Isagenix and his chiropractor. "I have been feeling better ever since I stopped having my head wrenched and being put on a rack and practically decapitated week after week, except for the apparently permanent click in my neck that wasn't there before."

"We fertilize our soil with fake nutrients and usually do not replace with all 60 nutrients the plants need to be healthy so they are prone to diesease [*sic*—a disease that they die from?] and incests [*sic*]." [Gotta watch out for those incestuous plants!]

"I never hear anything from the medical field about elevating the PH level in the human body to keep in from being to acidic. That study was done by Dr Lioness Paulings medical reseacher and nobel prize winner." [Errors in original. Lioness?!]

"Whoever started this blog is an idiot."

"I am amazed at the amount of ingnorance [*sic*] on this Blog. Whom [*sic*] ever allows this should be ashamed."

My favorite comment of all was "Dr Harriet Hall is a refrigerator with a head." I don't know what that means, but its whimsical imagery appeals to my sense of humor.

In looking back at this whole kerfuffle, it became clear to me that there had been a colossal barrier to communication. The person who had originally asked me about Isagenix, the blog owner, and I were all operating in the arena of science and evidence. Most of the commenters were operating in a whole different universe of discourse based on belief, hope, hearsay, and personal experience. Science is like a foreign language to them, and they were incapable of understanding my points. Pearls before swine . . . ■

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The Voynich Manucript

The Book Nobody Can Read

For almost 100 years, experts and amateur researchers have tried to solve the riddle of a handwritten book, referred to as the "Voynich manuscript," composed in an unknown script. The numerous theories about this remarkable document are contradictory and range from plausible to adventurous.

KLAUS SCHMEH

The facts regarding the Voynich manuscript can be told quickly. It is a handwritten book of 246 pages containing numerous illustrations and approximately 170,000 characters. What is special about it? The script employed is utterly unknown and therefore illegible. According to a radiocarbon analysis conducted in 2009 by the University of Arizona, the manuscript was created in the first half of the fifteenth century (probably between 1404 and 1438). So far, there is no written publication on this analysis, but one of the scientists involved in the examination confirmed by e-mail that a paper is scheduled for 2011.

The modern history of the Voynich manuscript began in 1912. At that time, a bookseller and book collector named Wilfried Voynich found it in an Italian Jesuit college. Further information is provided in a letter dated 1666, which—according to Voynich—was enclosed with the manuscript. This document names some other previous owners who had all lived in the first half of the seventeenth century, thus indicating that the manuscript had been written before then. On the basis of this letter, Voynich favored the English monk and Renaissance man Roger Bacon (1214–1294) as the book's author. However, this theory is now considered very improbable.

Not many more historic facts are known about the Voynich manuscript (Kennedy and Churchill 2005). In particular, it is unclear who wrote the book, what it contains, and what its purpose was. In light of the meager evidence, I—as a skeptic and member of GWUP (the German counterpart of CSI)—am not surprised at the great number of speculative theories about the mysterious script. I will present the most important ideas here.

A good point of entry into a Voynich analysis is certainly the script of the document itself. The author of the manuscript wrote from left to right—this can be discerned from the left-aligned formatting. The typeface and size of the characters are inconspicuous, which is not altered by the fact that the text contains no punctuation marks, because this is unexceptional for old texts. Thus it is evident to a layman, even before inspection of the illustrations, that the Voynich manuscript has its origins in European culture. Moreover, it is apparent that the author was quite accurate: there are no visible corrections in the text. Unfortunately, the Voynich text itself is not divided into chapters; there are no subheadings.

Uncommon Illustrations

Approximately 220 of the 246 Voynich pages are illustrated. Some of the pages can be unfolded, revealing illustrations that extend to several page lengths. Because, unlike the text, the illustrations can be divided into different sections, six chapters of the Voynich manuscript can be distinguished: the botanical chapter (with large plant illustrations), the astronomical chapter (with charts containing celestial bodies and the zodiac signs), the balneological chapter (with nude female figures in tubs), the cosmological chapter (with circles and rosettes), the pharmaceutical chapter (with plants, parts of plants, and pots), as well as a chapter with food recipes (without illustrations).

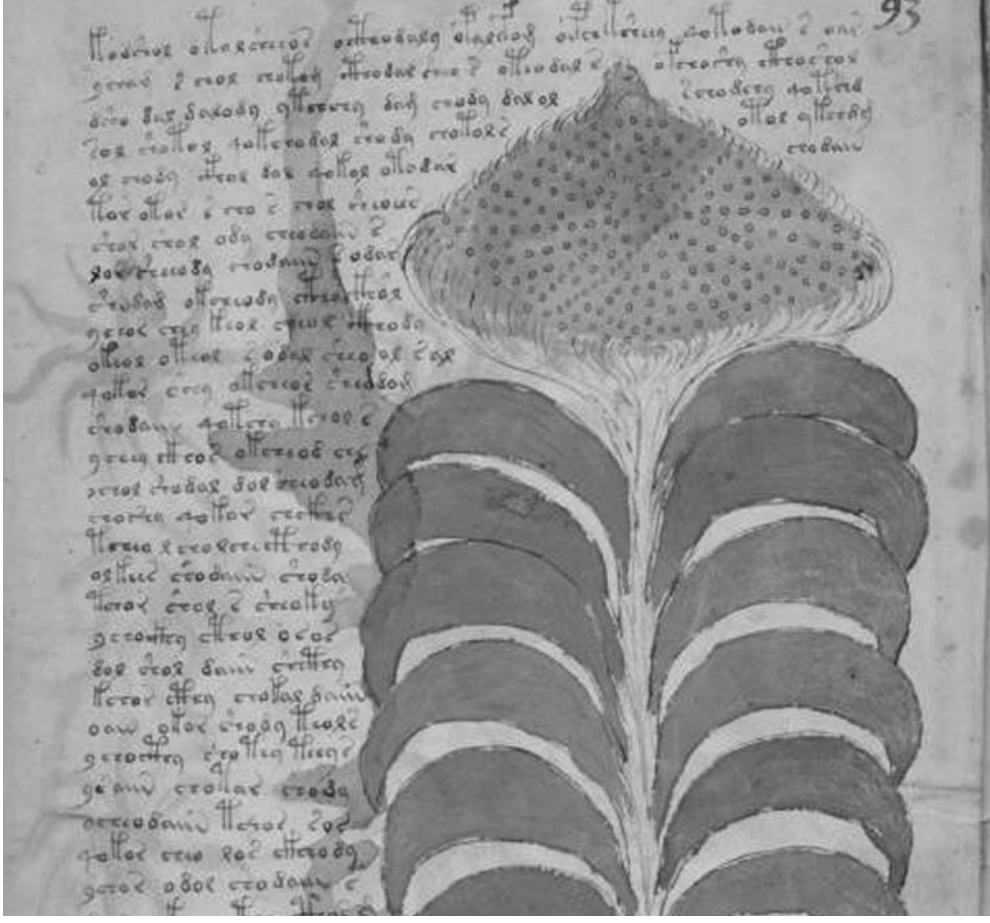
The different illustrations can hardly be related to a common topic. Thus the Voynich manuscript—if it has meaningful content at all—must be a treatise on many different subjects. One may possibly say that it is a textbook for magicians, physicians, pharmacists, and astrologers (when it comes to these professions, their borders were still blurred 500 years ago). Provided that it is hardly possible to recognize significant symbols and religious motives within it, the Voynich manuscript can neither be assigned to a certain school

of thought nor to a particular religion.

Unfortunately, none of the 126 plant illustrations can be definitively identified. However, the plant pictures at least enabled certain conclusions regarding the date of origin, before the radiocarbon dating was performed. Comparisons of artistic styles showed that the manuscript presumably did not originate before the fourteenth century, which was, of course, later confirmed. Not confirmed, however, was a theory stated by the botanist Hugh O'Neill (O'Neill 1944). He considered two plant illustrations as representing sunflowers and identified another one as capsicum. Because both plants spread in Europe only after the "discovery" of America, their identification appeared to narrow down the period of origin. However, the two identifications O'Neill made are not precisely compelling, and thus O'Neill's conclusion—like so many others in connection with the manuscript—is just speculation.

It is hardly more illuminating to take a look at the astronomical and the cosmological sections, which contain pictures that can be identified as the Zodiac signs still familiar today (Aries, Taurus, Libra, and so forth). Scarcely another illustration in the Voynich manuscript is as unambiguous. Unfortunately, this observation does not result in further insight into the book's origin. The celestial bodies illustrated in the astronomical section cannot be identified and probably are only figments of imagination. Some Voynich researchers believe they recognize in these pictures the Andromeda fog or the Pleiades, but this again is just speculation.

The hairstyles and clothing of the people pictured in the book, as well as the style of the illustrations, were usually dated to the period 1450–1520, which proved reasonably compatible with the radiocarbon dating (between 1404 and 1438). In most cases, the pictured persons are naked women in big tubs filled with water, which makes conclusive interpretation of these illustrations in the context of fashion impossible.



Botanist Hugh O'Neill (1944) identified this illustration as a sunflower. However, this interpretation does not appear to be completely conclusive.

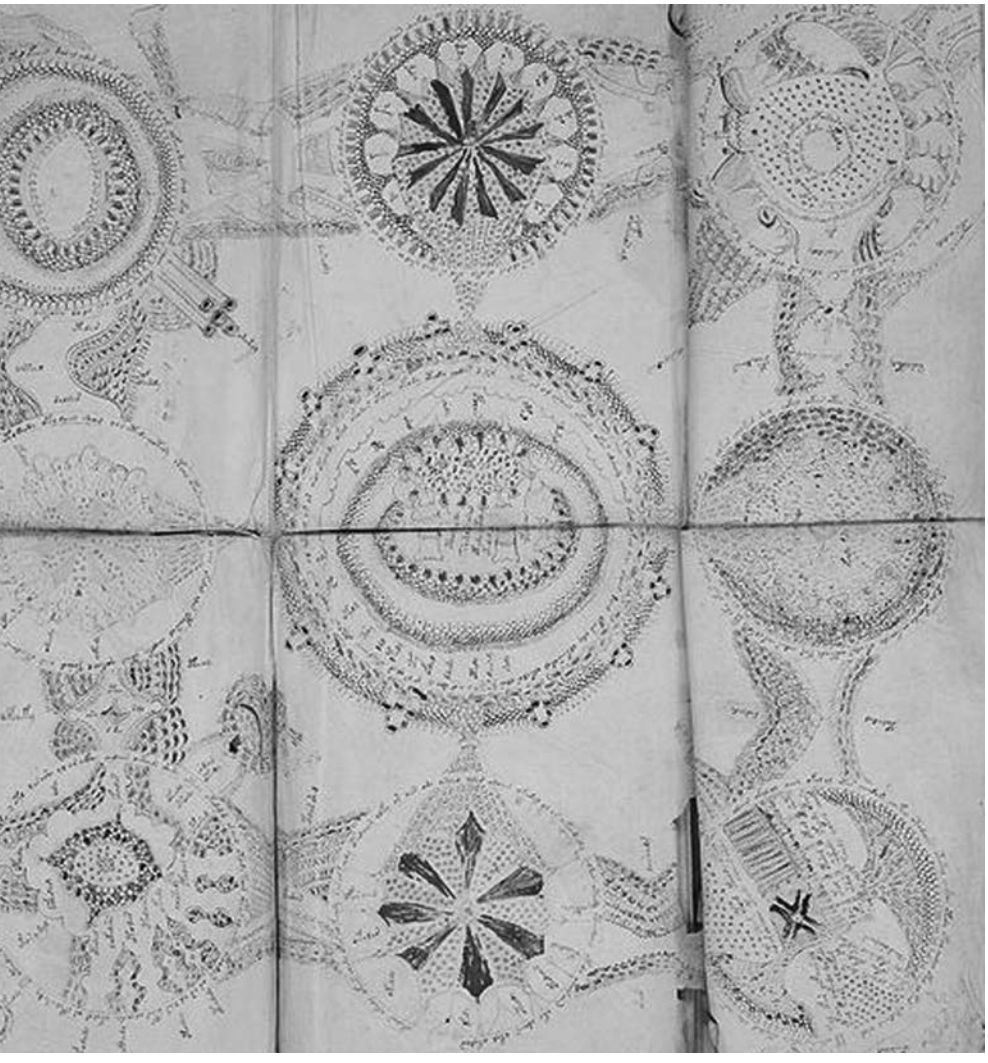
Taking all facts into account, it is astonishing how little the numerous illustrations reveal about the Voynich manuscript. Does this make an argument for the whole document being meaningless? Or did the author intentionally choose ambiguous illustrations to prevent inferences about the encrypted (and therefore secret) text? I consider both explanations to be possible.

Cryptological Analyses

A glance at the pictures in the manuscript is indeed interesting, but as a cryptologist I am naturally more interested in the Voynich text. It is unclear whether it is an encrypted message or simply a text composed of unknown letters. This is irrelevant for cryptological analysis, because the use of unknown letters is also a form of encryption. For the analysis of an encrypted text, cryptology provides quite a number of statistical methods—for example the determination of letter frequencies. Some of these analyses indicate that the Voynich manuscript is composed in a usual language but written in unknown letters. There are between fifteen and twenty-five different letters in the manuscript, but in many cases it is not clear whether identical or different symbols have been used. For this same reason, letter frequency cannot be determined clearly. Nevertheless, the language of the manuscript can be brought in line with European languages, because the average word length is four or five letters. Following this line of consideration, arguments can be put forward that Greek, Latin, or one of several other European languages was used to compose the Voynich manuscript. It is a pity that this approach does not implicate a specific language.

However, the language of the manuscript does not correspond to any European language because the Voynich has no two-letter words or words with more than ten characters. Moreover, it is curious that some words are repeated successively up to five times. The distribution of the letters within each word also does not answer known language patterns. Looking at the text as a whole, far fewer recurring words turn up than would be expected. Such arguments reveal with a high probability that—against all appearance to the

Detail of the Voynich manuscript text.



In the astronomical chapter of the Voynich manuscript are illustrations of celestial bodies and signs.

contrary—we are not dealing with a simple substitution of letters. There also is no clear evidence that other simple encryption methods were used.

A study by the philosopher William Newbold took another direction. Newbold declared he had solved the Voynich mystery in 1921 (Newbold 1928). He considered as relevant not the letters themselves but the small, barely visible marks applied to them. These marks supposedly formed Greek characters, making up a text that could be decoded into a meaningful message. The result seemed to be sensational: the produced message not only confirmed Roger Bacon as the manuscript's author, but it reputedly also revealed that Bacon already had a telescope at his disposal and knew the spiral structure of the Andromeda galaxy—either of which would revolutionize the history of science. But as expected, Newbold's decryption came across as largely arbitrary and moreover only worked for a short section of the text. Therefore Newbold's theory could not prevail.

In 1943, the lawyer Joseph Feely published a cryptological paper regarding the Voynich manuscript. Feely, too, presented as a direct result of his research the supposed solution of the Voynich encryption (Feely 1943). By means of statistical analyses, he had

None of the plants illustrated in the Voynich manuscript could conclusively be identified.

come to the conviction that the manuscript was composed in Latin and contained numerous abbreviations and abbreviated sentences. With this basis, Feely translated a forty-one-line section of the manuscript. Unfortunately, Feely's approach made no sense at all and therefore quickly turned out to be a further dead end in Voynich research.

The U.S. cryptologist William Friedman (1891–1969) was considerably more competent. He is regarded as the most successful code-cracker of all ages; his name guarantees cryptological quality. In the course of his forty-year career, Friedman examined thousands of encryption methods during his service for the U.S. military and solved almost all of them. Unfortunately, despite all the texts he successfully analyzed, he had to surrender in the case of the Voynich manuscript. He therefore could not bequeath more to posterity than an educated guess. Friedman considered the text to be a treatise composed in an artificial language.

More Current Studies

The next Voynich studies worth mentioning originate with Robert Brumbaugh, a professor of the philosophy of the Middle Ages. He holds that the unknown characters are numerals that are each assigned several letters of the Latin alphabet (Brumbaugh 1978). However, the decryption provided by Brumbaugh did not make any sense. Another dispensable Voynich analysis was published by the physician Leo Levitov in 1987 (Levitov 1987). He, too, believed that he had decrypted the text. According to Levitov, the book is composed in an old form of Flemish that assimilated German and French words. Levitov supposed that in this manner a literary language emerged that served as an alternative to the Latin language common at that time. According to Levitov, the manuscript turned out to be written by the Cathari in the Middle Ages. However, Levitov's paper is so full of speculative assumptions that it can barely be taken seriously.

The British linguist Gordon Rugg is among the most reputable Voynich researchers. He conducted a most interesting cryptological experiment. For his experiment, Rugg generated a table with random combinations of characters that he used as prefixes, roots, or suffixes of new words. He positioned a quadratic stencil, like the ones used for encryption in the sixteenth century, over the table. In this manner he obtained a sequence of letters that bore great resemblance to the text of the Voynich manuscript. Rugg's experiment supports the hypothesis that the manuscript is nothing but a compilation of meaningless lines of letters (the hoax hypothesis) (Rugg 2004). The hoax hypothesis is backed by a text analysis by the Austrian physicist Andreas Schinner. Schinner discovered unnatural regularities in the word order of the manuscript that do not occur in any known language. He therefore also came to the conclusion that the Voynich manuscript is a fraud's artful fabrication, containing merely meaningless nonsense (Schinner 2007).

A relatively new theory was published by Briton Nick Pelling (2006). He considers the Italian architect Antonio Averlino (1400–1469) to be the Voynich author. Pelling supposes that Averlino escaped to Constantinople (Istanbul) around the year 1465, having beforehand recorded his knowledge as encrypted in the Voynich manuscript. Pelling provides numerous cryptological analyses that supposedly allow us to infer an applied method, but he does not present a solution. If we accept an inaccuracy of a few decades, Pelling's theory is consistent with the radiocarbon analysis. However, I consider the Averlino hypothesis very speculative. In addition, it seems improbable that the Voynich manuscript—

which without any doubt would have attracted attention in the course of a luggage inspection—merely served as a means of secure transport.

What Is Behind It?

Looking at the diverse cryptological analyses of the Voynich text, we come to a similar result as we did regarding the illustrations: a seemingly good initial theory becomes downright poor once investigated. This is one of several reasons that at least one thing became clear to me after looking at the most important theories: the Voynich manuscript does not offer an obvious explanation. Nevertheless, it is possible to narrow down the solution. First of all, I am not aware of any convincing theory regarding the author of the manuscript. That the manuscript is a forgery made in the early twentieth century, which was a plausible and much-discussed hypothesis for decades, can meanwhile be ruled out. This assumption is not only disproved by the radiocarbon analysis but also by a recently discovered seventeenth-century document that mentions the Voynich manuscript. Therefore, we must search for the author half a millennium in the past. However, Roger Bacon and several other proposed authors (for instance Leonardo da Vinci) lived in the wrong time to be the author, and Antonio Averlino is a very speculative guess. This means that the author of the Voynich manuscript was probably an anonymous artist living in the first half of the fifteenth century. Maybe it was even someone who is completely forgotten today.

I am also not aware of a convincing theory explaining the meaning of the many figures in the Voynich manuscript. Neither the plants, which have no equivalent in nature, nor the other illustrations make any sense. The most likely explanation therefore is that the figures don't have a meaning at all. Probably they were just included to make the manuscript look more mysterious. If the figures have no meaning, it is very likely that the Voynich manuscript didn't serve a real purpose. My favorite explanation for the manuscript is that it was simply created to produce a mystery. Maybe the author intended to sell it for a large amount of money to a wealthy contemporary, or maybe he even acted by order of such a person. Another theory, which I consider plausible, posits that the Voynich author was a mentally ill person (for example, someone suffering from autism); it is quite common for mentally ill people to create art. As far as I know, this hypothetical origin of the Voynich manuscript has never been researched by an expert.

If the Voynich manuscript is really a hoax—as I suspect it is—it is very likely that the text is mere nonsense. However there are two other theories worth mentioning. The first one is based on a fact known by every cryptologist: that the design of a secure encryption procedure will become distinctly simpler if the encrypted text is longer than the original text. Under this condition, it is in fact possible to hide the original information in meaningless filler text. It is absolutely possible that the author of the Voynich manuscript used this trick. Perhaps he transferred an original, shorter text (e.g., 50,000 letters) into an unknown script and extended the result to the 170,000 letters he finally put down. Unfortunately nobody has yet discovered a pattern that allows the separation of the original from the filler letters. If such a pattern exists and is sufficiently complex, then there is only a minimal chance that it will ever be decrypted.

If the Voynich text is not simply nonsense, I consider the artificial-language hypothesis developed by William Friedman as a second plausible theory. It is certain that alchemists and scientists made efforts to develop secret languages during the Renaissance. Maybe such a secret language expressed in unknown letters forms the basis of the Voynich manuscript. However, there is no precise assumption as to what the underlying artificial language might have looked like.

However, the most probable theory is that the Voynich manuscript does not contain meaningful text. The papers of Gordon Rugg and Andreas Schinner suggest not only this theory of a hoax, but the assumption that the manuscript has no real purpose. In my view, there are still some interesting open research questions in this area. Was it possible to produce hundreds of pages of nonsensical text that has many things in common with natural language by using a method available in the fifteenth century? This question is heavily debated among Voynich scholars, and some think it impossible. However, there have been but few attempts to create a text that resembles the original. Rugg's method is one example, but there should be many more—involving encryption procedures as well as methods for producing meaningless letter sequences. If one of the results has statistical properties similar to those of the Voynich text, this might tell us which method the Voynich author applied.

The Voynich manuscript is and most likely will remain a riddle. We can hope that the manuscript will not merely become a playing field for mystics and pseudoscientists. After all, the subject is fascinating enough without adventurous speculation. ■

Note

The original German version of this article was published in the journal *Skeptiker*. This English version was translated by Susanne Kisser and edited by SKEPTICAL INQUIRER staff. In October 2010, the author updated this article with considerable new information.

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Klaus Schmeh, a computer scientist, works as an encryption expert for a German software producer. He is author of several cryptological and scientific books (mostly published only in German). His book *Codeknacker gegen Codemacher* (W3L-Verlag, 2007) deals with the history of encryption technology. He is a member of the German skeptic organization GWUP.

Hope: Faith, Atheism, and Agnosticism

JONATHAN C. SMITH

The great season of hope is upon us just in time. We have just survived the season of the skeptic's discontent. This season of hope began gently enough with James Randi's inspiring acknowledgement (at age eighty-one) that he is gay, saying it's no big thing. I smiled at his great, big move and welcomed him to the club. Then, sadly, Christopher Hitchens shared his fight with cancer, still viewing all religion as manmade and divine revelation as false. (He says any later confession of faith should be discounted as a symptom of progressing dementia. A holiday message for us all?) And, remarkably, in just two short months both the *New York Times* and the *Washington Post* graced us with nearly a dozen never-ending blogs on faith and atheism. And of course there's Anne Rice, known for her blockbuster gothic vampire novels. Rice created controversy among the spooky community of recreational paranormalists with her proclamation that she will never truly belong to the "quarrelsome, hostile, disputatious, and deservedly infamous group" known as Christians unless she becomes "anti-gay . . . anti-feminist … anti-artificial birth control . . . anti-secular humanism . . . anti-science . . . anti-life."

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This might be a good time to try to sort things out. When it comes to god, ghosts, and all things paranormal, what kind of believer (or disbeliever) are you? Are you a person of faith? Are you a believer/disbeliever of the first kind, second kind, or third kind? Does it matter? Most faith debates begin, dangerously, with dictionary definitions. Here faith is usually seen as (1) belief in a supernatural entity (god); (2) belief in anything for which there is no proof or contrary evidence; (3) uncritical belief in anything for any reason; or (4) confidence in a claim.

Types of Faith

Real-world faith claims can be confusing. I like to sort them into two groups: claims concerning objective facts and supernatural claims. For each, people embrace or reject claims on the basis of evidence, unfalsifiability, and emotion. These bases reflect faith of the first kind, faith of the second kind, and faith of the third kind (apologies to J. Allen Hynek).

1. Believers of the First Kind. Empirical faith claims are open to critical evaluation. These are provisional claims.

"I have faith in my doctor until he starts prescribing the wrong medications."

"I have faith that healing prayer works until my prayers go completely unanswered."

Skeptics of the first kind look for empirical evidence; presence or absence of objective evidence contributes to or reduces the reason for belief.

2. Believers of the Second Kind. Unfalsifiable faith claims are

A believer of the second kind might assert that unfalsifiability of a claim gives one license to accept the claim on faith alone.

assertions logically impossible to evaluate with evidence; support is not conceivable.

"I believe that the ability of psychics to read minds is a 'jealous phenomenon' that automatically becomes unmeasurable in the presence of scientists, skeptics, or magicians."

"I believe that God provides concrete answers to our concrete prayers but does so in a way that cannot be proven; he does not want to take away our free will."

"I believe that in the entire span of human history there has been at least one flying saucer landing that cannot be explained away logically."

The claim that a psychic can read your thoughts would seem to be easy enough to test. Simply conduct a blind reading. But it can't be tested because such a power is jealous. Similarly, one might think that the ability of the divine to heal an illness should be open to evaluation. Alas, this is not so if the all-powerful deity always wants us to keep guessing. Similarly, our flying-saucer claim seems open to assessment on the surface. One indisputable observation could make a convincing case, but negative evidence is not possible. There will always be an unexamined time or place, some hole deep under the Great Pyramid of Egypt, where a UFO may have landed.

Skeptics of the second kind do not embrace apparently empirical claims that are unfalsifiable: meaningless,unmeasurable, or universal negatives. In contrast, believers of the second kind may be comfortable asserting that their faith is based on something unfalsifiable. Such a believer might assert that unfalsifiability of a claim gives one license to accept the claim on faith alone.

3. Believers of the Third Kind. Emotional faith claims are believed for no reason other than personal preference. These are claims of blind faith.

"I have faith that George Washington never lied. No critical evaluation will change my mind."

"I have faith that healing prayer works for people I do not know and am not in contact with. I will not consider any critical evaluation of my claim."

"I cannot conceive of a universe without a god. Therefore there is a god."

Skeptics of the third kind wisely leave such people alone.

More on Faith Claims of the Second Kind (Unfalsifable)

Faith claims of the second kind are essentially immune to full application of the tools of critical thinking. However, such claims are often presented as if they have survived careful evaluation. We see the religious profess that doubt builds faith or that religion and science need not be in conflict. On close examination, one often discovers that the task of critical thinking has been applied superficially and terminated prematurely (aborted). More seriously, one might discover that openness to critical thinking in fact applies to peripheral claims (miracles of walking on water) and not central claims (resurrections).

Again, when such religious claims are of the second kind, they enjoy something of a protected status, ultimately immune from the onslaughts of critical thinking. Critical thinking may be applied partially, but it is applied only in service of the claim (doubt builds faith). Claims of the first kind are by definition provisional and open to challenge. Claims of the third kind are blind. Although they may or may not be open to challenge, they reflect an easy or narcissistic decision to embrace a belief simply because one wants to (or because it feels right, is very beautiful, or is highly desired) and an equally narcissistic choice to reject courageous and possibly uncomfortable attempts at critical evaluation. This is blind faith.

Issues of Faith, Science, and Atheism

Much has been written about the presumed conflict between science and religion. The role of faith is one important issue. Our schema may help sort things out.

The Faith of Science

Both the scientist and the religious believer have faith. However, it is a profound oversimplification to equate the kinds of faith they embrace. A scientist trusts the tools of critical thinking and the body of scientific findings produced by such tools. Such trust represents objective faith of the first kind. It is pro-

visional and could conceivably be altered in the face of new evidence. In contrast, objective faith of the first kind is anathema to the religious believer. Religious faith is typically of the second (unfalsifiable) or third (blind) kind, both of which are anathema to science.

Atheism and Agnosticism

Going further, those who choose not to embrace supernatural faith and do not believe in a theistic god are atheists. Here again we can identify several kinds of atheistic lack of faith. One who is an atheist of the first kind believes that supernatural entities do not exist but is willing to change one's mind in face of new evidence. But is this not agnosticism? Agnosticism is a doctrine that a god is possible, but there is not sufficient reason for accepting or rejecting this belief. Atheists believe that there is, for now, sufficient evidence to make an intelligent choice. Thus, both agnostics and atheists of the first kind may change their minds when confronted with credible evidence; until this happens, the atheist chooses not to believe whereas the agnostic chooses not to make a decision.

This is worth elaborating. The agnostic stance is essentially that "the jury is out" concerning a claim. Sensible and thinking people, including true believers, make up their minds all the time. It is perfectly reasonable to decide not to believe in intelligent life on the moon, the power of herbal tea to extend life by fifty years, or even the claims of famous psychics like Uri Geller that they can sometimes bend spoons with their thoughts. Indeed, it would be a bit silly to assert, "Are there moon-men? The jury is out. Is green tea the fountain of life? The jury is out. Are spoon-bending psychics real? The jury is out." An absence of faith in such claims does not reflect a rigid atheism because it does not preclude the possibility that at some time supportive evidence for the claim might emerge. These are atheists following the simple rules of common sense.

Of course, an atheist of the second kind asserts that the notion of a theistic god is a meaningless construct because it is unfalsifiable. The question of whether or not such an entity exists is equally devoid of meaning. One might just as well posit the existence of an invisible pink unicorn or, my favorite, a Flying Spaghetti Monster (see my book *God Speaks: The Flying Spaghetti Monster in His Own Words*). Such an atheist may claim that purely supernatural hypotheses are unnecessary for explaining natural phenomena.

It would be a bit silly to assert, "Are there moon-men? The jury is out. Is green tea the fountain of life? The jury is out. Are spoon-bending psychics real? The jury is out."

An atheist of the third kind refuses to accept evidence for a theistic god, even if such were to emerge. It is always possible that a naturalistic explanation may exist for any claimed supernatural event. If faced with an apparent paranormal event, an atheist of the third kind may tolerate not having a naturalistic explanation over prematurely embracing one that is supernatural. For them, "I don't know" is always better than "God did it."

Does Faith Survive? Pandora's Box or Source of Hope?

Through faith one may accept as fact a claim that has yet to earn credible support. Doing this poses an enormous risk. To be intellectually honest, one must accept as fact all claims with comparable support. If you believe in witches because you have a hunch, or you believe the expert testimony of a single professor, then you must respect the testimony-based hunches of everyone, including those who believe in vampires, ghosts, pixies, and the inferiority of women, gays, Muslims, and so on. It's a true Pandora's box of a holiday gift. One way out is to proclaim a personal, special exemption from the rules of honesty and accept one's preferred faith claims while questioning those of others. But such narcissistic intellectual fascism is currently out of favor in Western civilization.

Finally, is there hope at the bottom of the box? Can one be an atheist, of any kind, and live a spiritual life? Of course. As I wrote in *Pseudoscience and Extraordinary Claims of the Paranormal*, "The spiritual journey is a search for transcendent realities and possibilities hidden in the fog of selfishness, superstition, and ignorance" (p. xii). This does not have to be a sky god, an imaginary friend in Jesus, or a dizzying touch of quantum consciousness. But one must always be on the lookout for vampires or false gods. They can capture your soul for decades. That's my message of the season.

Paranormal Beliefs and Insight

If paranormal believers and people with mental illnesses share commonalities, it is not in symptomatology but in a limited capacity for insight.

GARY M. BAKKER

It would not be surprising if a skeptic were to ask a clinical psychologist, "Are true believers in the paranormal crazy?" There does seem to be some sort of "crazy thinking" going on. But is this crazy thinking psychotic—such as occurs in schizophrenia—or is it a more subtle and widespread type of craziness?

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This is the question addressed by Jonathan C. Smith in his previous Forum column, "Paranormal Beliefs and Schizophrenia" (SI, September/October 2010). Smith pointed out that it is not the occurrence of psychotic symptoms (such as auditory hallucinations) that true believers and schizophrenics have in common, but rather the way they each see and explain their bizarre experiences.

So, true paranormal believers are not crazy in a psychotic sense. Similar to people with schizophrenia, they lack *insight*. I don't mean insight in a shallow, specific, temporary sense, such that a proper read of a good skeptical article might set them straight. I mean they lack insight in a radical, deep, even neurological sense: as can occur in many psychological/psychiatric disorders.

Schizophrenics are renowned for lacking this kind of insight. With few exceptions, even when they are well—that is, not floridly psychotic—schizophrenics generally just don't get it. They downplay, ignore, or even try to justify their bizarre beliefs and behavior.

Smith's speculation about why schizophrenics may do this is a psychological one: They may be trying to reduce their terror by attributing the voices they hear to an outside source such as space aliens. There are many problems with attempts at such a psychologically rooted explanation. First, it is unclear how "Space aliens are controlling my thoughts" is less frightening than "I have a mental illness causing delusional thinking." Second, insight-oriented psychotherapies such as psychoanalysis have had a dismal record in treating psychosis. Even cognitive-behavioral therapy, which relies on some degree of insight to motivate its cognitive control strategies, has so far had only a limited and temporary effect on psychotic symptomatology. Third, usual levels of insight across the different psychopathologies do not correlate with the degree of anxiety involved in the disorder. I will now provide three examples of this lack of an insight/anxiety correlation.

I had once been asked to assess an older man who pointed a gun at a neighbor because he believed the neighbor had been jumping his fence and interfering with items in his backyard. When I visited this man, he showed me the rough edges of an old concrete path that the neighbor had allegedly been chipping away at during the night. This man had a delusional disorder. There was no fear involved, but there was much misguided anger. That man had absolutely

no insight into the distortions in his thinking or logic, nor had he any reasonable evidence for his belief that his neighbor had been in his yard.

On the other hand, I have worked with hundreds of people suffering from panic disorder. With this condition, life stress, too much coffee, or some other cause brings on a spontaneous "panic attack," which, because it is an unpredictable and horrendous experience, causes fear that another attack may occurr at any time. This fear perpetuates the anxiety, which can in turn make the sufferer feel like a panic attack is about to come on. If unchecked, this cycle can lead to agoraphobia as the person avoids more and more "unsafe" situations due to the fear that an attack will occur. The treatment of panic disorder can be as brief as three sessions; the attacks stop after the above "problem-maintaining circles" are explained to the sufferer and better coping techniques are practiced—that is, once insight is achieved. This disorder is not characterized by a lack of capacity for insight.

A third example spans the spectrum of insight capacity. Some people with obsessive-compulsive disorder (OCD) are able to see that their thoughts, fears, or behaviors—such as washing their hands a hundred times a day—are excessive, abnormal, or unjustified. It is still hard for them to perform the "exposure and response prevention" necessary to control the disorder, but they are willing to try because they see the need. Others, though, especially those with body dysmorphic disorder (who may think, for example, "my nose is huge and red and ugly" when it is not), find it impossible to agree, even in theory, that their thoughts are delusional or that plastic surgery is unnecessary. It is these people with OCD who generally form the core of untreatable cases. They *just don't get it* and avoid, refuse, misunderstand, or lapse in their "exposure and response prevention" treatment.

In these cases, insight is a hard thing to instill. It is the capacity for insight, seemingly at a neurological level, that is missing. Some people who have had a stroke will neglect or ignore one side of the body. Pointing this out to them may or may not help. Some even disown their arm, asserting that it belongs to someone else! Brain scans of girls with anorexia nervosa show that when they look in the mirror, they actually hallucinate and *see* a fat person.

It is hard to engender insight in someone who is malfunctioning neurologically, but I always try. For example, I offer OCD sufferers this analogy: If you woke up one morning and smelled something burning, first you'd go around and check for fire. But if you found none, you might ask your spouse/family about it. If they said they smelled nothing, and you found that the smell came and went randomly or never varied at all, then you would be suspicious and maybe go see your doctor. The doctor might run some tests and finally tell you it's a brain thing—your "burn smell" center is firing all the time by itself. You'd have to learn to ignore this "false alarm" and stop reacting to it. The only difference between this problem and your OCD is that it's not your "burn smell" center that's out of control, it's your "danger, watch out, I have to do this or something bad will happen" center that's out of control. Some OCD sufferers can identify with this analogy, and their insight helps motivate them to begin ignoring their compulsions. Others simply cannot.

Thinking scientifically can clearly be achieved through training and so is worth a try. But some will never get it. They are hardwired to believe in the paranormal.

Similarly, some true believers in the paranormal may be amenable to logic, especially if they are exposed to it at a young age. Thinking scientifically can clearly be achieved through training and so is worth a try. But some will never get it. They are hardwired to believe in the paranormal.

I have had hypnagogic and hypnopompic experiences, hallucinations that can occur at the edges of sleep as the dream state blurs with the waking state. But I have never taken them seriously, let alone claimed the existence of little green men due to them. On the Australian rules football field, I have had the experience of being punched and then realizing I had dreamt every detail of the incident the night before. Of course the punch actually affected me neurologically, so that the memory felt as though it was coming from a prior dream. I did not actually have a dream that I would be punched during the match. My point is, this experience did not cause me to become a believer in dream precognition.

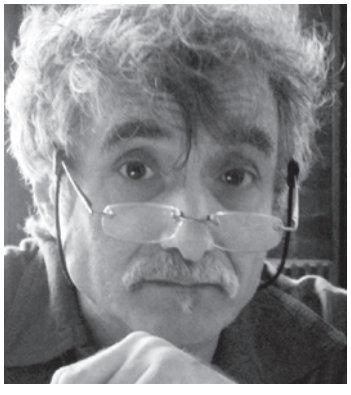
I have insight into these bizarre experiences. But some people don't have insight into their bizarre experiences, and perhaps they are even incapable of obtaining it. What counts for them as evidence for a belief is completely different from what counts as evidence for you and me. ■

The Right Stuff

Will America's (Foolish) Optimism Stare Down the Recession?

STEVEN DOLOFF

In a college English class I was teaching, filled mostly with African American and Hispanic students, a reading assignment prompted a discussion of ethnic minorities' economic disadvantages in the United States. Assuming we were all on the same page, as a "liberal" I couldn't resist weighing in and expressing my own professorial indignation on the subject as well. But one slightly older student (let's call him Roberto), who until now had said little during the semester, politely demurred.



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"I don't believe that," he said. "I can't believe that."

"Why?" I asked.

"I was in the Marines," he answered. "They told me about 'the door.' Do you know what I'm talking about?"

No one did, so he explained: "In the Marines they taught me that no matter what horrible situation I might find myself in, there will be a door that will let me out, and if I look for that door I will find it. If you tell me because I'm Hispanic I'm screwed, I can't accept that. I don't care what statistics you give me. I have a wife and a kid and a job, and this school is my door, and I believe we're going to be okay. No offense, but you're not helping me by telling me I'm disadvantaged being Hispanic in America."

A lively class discussion ensued, and my own head spun.

The facts of minority disadvantage notwithstanding, for the first time I realized how an American mindset—perhaps *the* American mindset—can place itself in flat-out opposition to a logically constraining reality, and that's not necessarily a bad thing.

Roberto's perspective reminded me of "the right stuff" that Tom Wolfe explored in his 1979 book of the same name. Wolfe was describing the essential fighter-pilot mentality of the early NASA Mercury Program astronauts of the 1960s. They ignored the grim statistics on combat and experimental aviation and instead viewed mission failure (death) under *any* circumstances as the result of individual human error—*avoidable* by those endowed with a sufficient amount of a particular but somewhat ineffable combination of steely confidence and initiative: "the right stuff."

This willful trumping of circumstantial disadvantage by sheer faith in innate resourcefulness harkens back to a more primal American ethos, that of the early New England Puritans. America's first European settlers believed that those among them predestined to be saved also had "the right [spiritual] stuff" and were therefore divinely allowed to prosper in their new land. Those who didn't have it failed. Simply put, personal courage bespoke salvation in this world *and* the next.

It has often been noted how this same faith in self-demonstrating salvation has, in a more secularized form, permeated the cultural DNA of American society ever since. Social commentators during the nation's nineteenth-century industrial boom idealized the innately proactive "self-made man" and stigmatized the will-deficient "born loser." If economic socialism remains an anathema in Amer-

ican public discourse today—at least as an abstract proposition—it is because our citizens just can't grasp how personal self-affirmation can be achieved through federal dispensation. (And also, why should slackers be saved?) Similarly, if labor-union membership is at a record low, it's probably because American workers, deep down, still believe that individual gumption and resourcefulness will get them what they need—or else they don't deserve it. (And collective bargaining seems like just more socialism for non-competitive losers.)

But who knows? Maybe this trait of optimistic individualism is truly genetic. The great majority of Americans are the descendents of—or are themselves—immigrants who believed enough in themselves and their personal chances of success to jump headlong into a rough-and-tumble new world. So we are literally a self-selected gene pool of risk takers, hardwired to believe in Roberto's door.

To be sure, it is no coincidence that, as social critic Barbara Ehrenreich has observed, Americans have also been exploited since the mid-nineteenth century by a massive and massively profitable "positive thinking" industry. Today, despite the hard-nosed economic realists piping in the media and genuine suffering caused by the recession, Americans remain awash in the monetized optimism business. Whether fronted by megastar self-help boosters like Oprah Winfrey, alternative-medicine gurus like Deepak Chopra, or corporate motivational speakers like Tony Robbins, the message has never been louder: if you believe—really *believe*—you can (diet, heal, profit, succeed, whatever), then you can! But as Ehrenreich has pointed out, the essential cheat in this message is not in the dreams themselves but in the seductive ease, the implied "wishing makes it so" means, by which these dreams may be realized.

If we Americans seem so susceptible to these profiteering pied pipers of confidence, it may be because, ironically, they really had us at "hello." Despite all the stark statistics, sober analysis, and smell-the-coffee reality dispensed before and after the recent financial crises, odds are that we (or more likely our children) will again recklessly invest in pie-in-the-sky IPOs that pop like bubbles. We will again, if permitted, take out mortgages we should rationally anticipate not being able to pay off. And count on it: we will again crash and burn, simply because we don't believe we will. Perhaps it is in the nature of how true liberty works. If we are really free in America, then we must be free to be fools, too. We will pay for our mistakes (and yes, the burden will fall much more on some than others—we need to do something about that) and then we will make more.

For better or for worse, there is clearly some fundamental expression of American character in this disposition of perennial, reckless optimism. Not sure? Answer me this: do you or don't you, in your gut, expect America to come out of this recession sooner rather than later and (eventually) get to Mars? I rest my case. ■

If we Americans seem so susceptible to these profiteering pied pipers of confidence, it may be because, ironically, they really had us at "hello."

Fooling People for Money and Profit

GREG MARTINEZ

Abel Raises Cain
Directed by Jenny Abel and Jeff Hockett.
Abel Raises Cain, LLC, 2009. DVD.

Shades of Gray
Directed by Bob Wilkinson.
Seminal Films, 2010. DVD.

In recent years, the documentary film genre has blossomed, finding increased audiences and a wider distribution through the DVD format. Recently two small, independent productions linked by subject matter have been released: portraits of prominent twentieth-century hoaxers Alan Abel and Gray Barker.

Abel Raises Cain is a jolly, affectionate portrait by Jenny Abel of her father, Alan Abel, a puckish gadfly who has tormented the mass media since the 1950s with a series of well-planned hoaxes. The film depicts him as currently down on his luck and living in the basement apartment of a friend's home in Connecticut, with his belongings and archives in storage. The documentary traces his peripatetic rise from Ohio State University graduate and percussionist with the Glenn Miller band during World War II to an accidental beginning as a professional hoaxer.

In 1959 Abel wrote a satirical story about an imaginary organization called The Society for Indecency to Naked Animals (SINA), which broadly parodied the prudishness of contemporary sexual morality. It was written as a plan to clothe naked animals, protecting children from such an indecent sight (one slogan was "A nude horse is a rude horse"), with such subtlety that the editors of the *Saturday Evening Post* angrily rejected it, unable to discern its satire. As a lark, Abel transformed the piece into a series of press releases that garnered national media attention. As interest rose, he persuaded his friend Buck Henry, then an unknown actor, to pose as the group's president, G. Clifford Prout, turning their public appearances into a cross between Swiftian satire and performance art. With the support of his wife Jeanne and Henry's considerable improvisational skills, the farce was maintained until a *Time* magazine article in 1963 exposed the hoax. But Abel's future path was fixed.

Abel began a career of fooling reporters, talk-show hosts, and other members of the media with a series of sturdily constructed and just-plausible-enough stunts.

Abel began a career of fooling reporters, talk-show hosts, and other members of the media with a series of sturdily constructed and just-plausible-enough stunts that exposed the truth behind television and radio's need for lively narratives and sensation (or as he puts it in the

film, "perversions and calamities") at the expense of actual reporting and research. Booking agents for evening newscasts and afternoon chat shows were all too ready to suspend their skepticism and good judgment to book guests who were sure to inflame their audiences with safe, pointless outrage over such non-controversies as a phony group that was against breastfeeding (because it was borderline incestuous). In another hoax, Abel, calling himself Omar, promoted the fake "Omar's School for Beggars"—which taught effective ways to beg for money—on Tom Snyder's NBC show *Tomorrow* and Mike Douglas's syndicated talk show.

Abel was able to sustain these and many other hoaxes for decades, but the advent of the Internet, cable television, and the twenty-four-hour news cycle has diminished his ability to pull these off as successfully as he once did. Abel's clever and witty voice has been drowned out by a cacophony of angrier and less coherent voices, though other media hoaxers have emerged (see, for example, the 2003 documentary *The Yes Men*).

* * *

Gray Barker, a figure familiar to many readers of this magazine, is the subject of *Shades of Gray*, a feature-length profile of Barker's extensive career in the UFO field as a promoter and hoaxer. As he emerges in the sensitive hands of director Bob Wilkinson, Barker's a complex and sad figure who cheerfully (and perhaps a bit cynically) exploited the gullibility of the UFO crowd from the 1950s through the 1970s.

Born in 1925 in Riffle, West Virginia, Barker moved from obscurity into slightly less obscure notoriety as the most industrious of the UFO-craze promoters of the 1950s. Attaching himself to a succession of "contactees," Barker eventually worked himself into prominence with his energetic (and mostly false) promotion of some of the most notable saucer myths of the late twentieth century. Stories of the Flatwoods Monster, the Mothman, and the Silver Bridge Collapse all originated practically in his backyard, and he peddled those tales to an eager and credulous mob of believers. But his most significant contribution to the field was his development of the "Men in Black" myth in his 1956 book *They Knew Too Much about Flying Saucers*.

The film plays out in a series of acts; the first reviews Barker's career as a saucerian (a turn of phrase that eventually provided the name for his self-published magazine), then takes away the mask of entertainer to scrutinize him as a person. Barker was a member of an extended family and a citizen in a rural town (he earned his living as a film distributor to drive-ins and small-town theaters). He was also a deeply closeted homosexual, and his friends and colleagues eventually began to speculate about how his time in the closet affected him and influenced his career as a hoaxer and a fabulist. Barker died at age fifty-nine from multiple-organ failure (his friend James Moseley speculates that it was probably due to AIDS, but they didn't know what AIDS was at the time). It seems now, more than twenty-five years after his death, that much of his life was a hoax.

* * *

Different in their approaches, these two films are similar in their carefulness and craft. They both thoughtfully present rounded and absorbing portraits of people whose chief claim to fame is their skill at lying to us. These films give us some insight into the restlessness at the heart of such hoaxers, but the sobering aspect of these movies is how eager people are to consume lies—and still want more. ■

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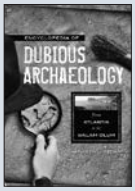
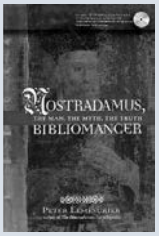
[NEW BOOKS

ENCYCLOPEDIA OF DUBIOUS ARCHAEOLOGY: From Atlantis to the Walam Olum. Kenneth L. Feder. Greenwood, Santa Barbara, California. 2010. 293 pp. Hardcover, $85. *Encyclopedia of Dubious Archaeology* is a handy, welcome, and authoritative yet highly readable short encyclopedia giving the scientific viewpoint on scores of controversial topics and claims that appeal to popular audiences about the human past. Feder is professor of anthropology at Central Connecticut State College, author of *Frauds, Myths, and Mysteries* (also newly out in a 2010 edition), and a CSI fellow and SI consulting editor. He has a knack for writing succinctly and with a light—even personal—touch about these supposed mysteries. He always provides short but nuanced assessments and appropriate published scientific information that places these topics into proper context. Most entries run no more than a page or two, so it is easy to skip around to topics of personal interest: African Inspiration of the Olmec, Atlantis, *Ancient American* magazine, Edgar Cayce, Chinese Discovery of America, Crystal Skulls, Barry Fell, Graham Hancock, Lost Civilizations, Mars Face, Nazca, Nazi Archaeology, Noah's Ark, Piri Ries Map, Shroud of Turin, Sandia Cave, Vinland Map, and Erich Von Daniken, to name just a few. —K.F.

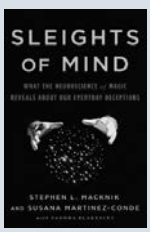


IMPLAUSIBLE BELIEFS IN THE BIBLE, ASTROLOGY, AND UFOS. Allan Mazur. Transaction Press, New Jersey, 2009. 246 pp. Hardcover, $34.95. Allan Mazur, professor of public affairs at the Maxwell School of Syracuse University, offers an explanation of why otherwise intelligent, educated people believe a variety of unlikely claims. The book mostly focuses on—as the title suggests—beliefs about the Bible, astrology, and UFOs, but Mazur covers many subjects, including deceased Harvard UFO-abductee believer Dr. John Mack and suicide cults such as Heaven's Gate and the Peoples Temple. Mazur's discussion of the mass media's handling of alien-abduction stories is particularly insightful. Part 4 of this book is perhaps the most valuable for its general discussion of the ways in which people develop and sustain irrational beliefs in the face of disconfirming evidence. Overall, this is an interesting contribution to the discussion about the psychological and social reasons why people adopt, and maintain, implausible beliefs. —B.R.

NOSTRADAMUS, BIBLIOMANCER: The Man, the Myth, the Truth. Peter Lemesurier. New Page Books, Pompton Plains, New Jersey, 2010. 288 pp. Softcover, $18.99. At first glance, this new book about Nostradamus appears to be just more New Age filler, another book churned out amid a sea of similar titles on alternative medicine, quantum consciousness, "new" information about the Roswell crash, and so on. For a man who hasn't written anything in well over 400 years, Nostradamus's works and biographies show no signs of slowing down. However, this title merits attention for several reasons. First, Lemesurier (a former Cambridge linguist and author of nearly a dozen books on the French seer) takes a refreshingly skeptical view of Nostradamus: After reexamining the original sources and looking at the latest research, Lemesurier concludes that Nostradamus was neither a doctor nor an astrologer, nor even (by his own admission) a prophet. He merely believed that history repeats itself, thus he projected known past events into the future. Second, Lemesurier debunks many of the modern myths about Nostradamus, such as his prediction of the World Trade Center attacks. The book also includes translations of all the major prophecies and comes with a CD containing images of Nostradamus's original prophecies published between 1555 and 1668. Overall, it is a recommended addition to the skeptic's library. —B.R.

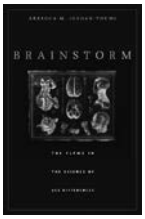


SLEIGHTS OF MIND: What the Neuroscience of Magic Reveals About Our Everyday Deceptions. Stephen L. Macknik and Susana Martinez-Conde, with Sandra Blakeslee. Henry Holt, New York, 2010. 304 pp. Hardcover, $26. The authors, both neuroscientists, say this is the first book ever written on the neuroscience of magic—or, if you will, neuromagic. In this book, written with veteran *New York Times* science correspondent Sandra Blakeslee, Macknik and Martinez-Conde use neuroscience to explain at the fundamental level why we are so thoroughly vulnerable to sleights of mind and how deception is part and parcel of being human. The authors are both directors of labs at the Barrow Neurological Institute in Phoenix, Arizona, and regular contributors to the *Scientific American* family of publications (a summer 2010 special-edition issue of *Scientific American Mind* was devoted entirely to their articles on illusions). For this book, they worked closely with famous magicians and skeptics—including James Randi, who endorsed their



Challenging the Presumed Dominance of the Brain

PETER LAMAL



Brainstorm: The Flaws in the Science of Sex Differences

By Rebecca M. Jordan-Young. Harvard University Press, Cambridge, Mass., 2010. ISBN: 978-0674057302. 408 pp. Hardcover, $35.

Rebecca Jordan-Young sets out to examine the widely accepted answers to questions about the nature and causes of differences between men and women. In *Brainstorm: The Flaws in the Science of Sex Differences,* she questions "what we 'know' about male and female brains, or gay and straight brains" (p. ix). She asks whether putative brain differences are the cause of male-female dissimilarities in behavior, personality, and desires—or the effect of such dissimilarities.

Jordan-Young is particularly interested in research concerning the effects of prenatal hormones, about which there is a widely shared presumption that they cause sex-typed predispositions. She uses the term "brain organization research" to refer to this field. According to brain organization theory, males and females have different brains because of early exposure to sex hormones. The process is also said to be responsible for within-sex differences in sexual orientation: thus "gay brains" are different from "straight brains."

But what has been lacking in this field is a comprehensive synthesis of the studies that underpin brain organization theory. Each study of how prenatal hormones supposedly organize the human brain is a quasi-experiment rather than a proper, controlled experiment. Because of this, a meta-analysis of the studies, which involves pooling their data, is not possible. So Jordan-Young instead conducts a synthesis of the different studies: each is placed within the overall body of studies by mapping its structure to see how well it fits.

Brain organization theory is not just about the behavior involved in reproduction or courting. It is said to explain a very wide range of differences related to gender and sexuality, including verbal ability, spatial relations, math aptitude, tendency to display nurturing behaviors, and sexual orientation. The core of the program, however, is the development of sexuality.

The hypothesis underlying brain organization studies has two main tenets: 1) male-typical sexual orientation and gender identity correlates with other male-typical physical or psychological traits (likewise for female-typical sexual orientation and gender identity); 2) physical and psychological traits are correlated because both are influenced by hormones during the critical—primarily prenatal—period of development.

In a chapter devoted to analyzing brain organization studies, Jordan-Young writes that as sexuality research becomes more sophisticated, human sexuality seems to look more complicated. Research on sexuality involves the measurement of very complex phenomena, yet key researchers assured Jordan-Young that the constructs that are the focus of their work are "common sense." Therefore, measures for most traits associated with sexuality have not been seriously debated by brain organization researchers. A close look at such measures is needed. If, for example, the definition of "homosexuality" in one study is quite different from the definition of "homosexuality"in another study, two conclu-

sions are possible: that "homosexuality" is not an obvious concept or that studies using different definitions of homosexuality cannot be seen as though they are dealing with the same phenomenon. The meanings in the two studies are asymmetrical. Jordan-Young lists three questions that require affirmative answers for symmetry to be present. At the same time, definitions do not necessarily need to be exactly the same across studies, because a strong relationship between influences and outcomes can withstand minor definitional differences.

How have brain organization researchers come up with their definitions and measures of masculine and feminine sexuality? Jordan-Young describes the shifts in definitions from the late 1960s by focusing on feminine sexuality because of the significant broadening of its definition. In recent brain organization studies, females who have high libidos, multiple partners, and frequent sexual encounters are viewed as exhibiting normal female sexuality. In the past, each one of these characteristics was interpreted as solely part of masculine sexuality. Surprisingly, this change has gone unnoticed, which is an example of how brain organization scientists' "cavalier approach to definitions of their key variables has led them to be conceptually sloppy, and the result is devastating for the existing network of evidence about brain organization" (143). Also, sexual orientation is notoriously difficult to define, and brain organization research about it is marked by contradictions.

Scientists' very different ways of measuring homosexuality have produced a network of studies that seem to be convincing and mutually supportive, but they are actually fundamentally at odds.

With respect to sexual orientation, Jordan-Young addresses three measurement issues: sexual orientation, framing, and quantifying orientation. The conclusion she draws from her assessments is that the pattern of research findings indicates that brain organization theory is not a good explanation for human sexual orientation.

The chapter on sex-typed interests describes a view that is compatible with behaviorism. Initial propensities are reinforced through social learning, and "gender-bifurcated reinforcement in turn amplifies the original [sex-typed] differences" (201).

The chapter titled "Taking Context Seriously" considers some key aspects that are excluded from brain organization research. Neglected is well-established evidence that the brain and the neuroendocrine system are *not* the foundations that give rise to behavior and cognition.

In the concluding chapter, "Trading Essence for Potential," Jordan-Young says that hormones do affect development. There are differences, on average, between males and females in a variety of characteristics. The problem is that brain organization theory attributes a false specificity and permanence to early hormone effects, positing a demonstrably false inevitability and uniformity to sex differences.

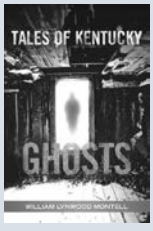
This book is thick with information. Area after area is cited in which there are studies of particular hypotheses (e.g., correlation of handedness with sexual orientation) that report conflicting results. Furthermore, many studies described in the book have not been replicated. Jordan-Young's work is a welcome antidote to the current popularity of the assumption that (à la Steven Pinker) brain structure and function are the determinants of human behavior.

There is significantly more information in *Brainstorm* than I have covered in this review. Some readers may want to skip some of the many chapter notes, quite a few of which are lengthy. But this is an important book. Read it. ■

Peter Lamal is emeritus professor in the Psychology Department of the University of North Carolina–Charlotte. He is a fellow of the Division of Behavior Analysis of the American Psychological Association and a member of the Association for Behavior Analysis International.

project; Penn and Teller; Mac King; Johnny Thompson; and others. Chapters are devoted to such topics as visual illusions and magic, the secret of the bending spoon, cognitive illusions, multisensory illusions, memory illusions, and expectations and assumptions—and how magicians employ these things to deceive us. All the chapters are relevant to science and skepticism, but a particularly pertinent one for skeptics deals with illusory correlations, superstition, hypnosis, and flim-flam. Magic tricks work, Macknik and Martinez-Conde note, because humans have a hardwired process of awareness and understanding that is hackable; magicians do the hacking. The value of such understanding goes beyond scientific curiosity. It helps us see how the same cognitive tricks are at work in advertising strategy, business negotiations, and interpersonal relations. —K.F.

TALES OF KENTUCKY GHOSTS. William Lynwood Montell. University Press of Kentucky, Lexington, 2010. 224 pp. Hardcover, $24.95.

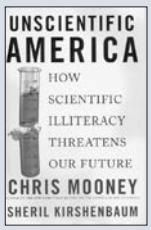


Montell, a professor emeritus of folk studies at Western Kentucky University, collected more than 270 stories from all around Kentucky. His informants run the gamut from college students to attorneys, and homemakers to professors. The tales are arranged by theme, and chapters include "Cemetery Ghosts," "Civil War Ghosts," "Headless Ghosts," and "Animal Ghosts and Animal Tales." Though Montell takes a less-than-skeptical view of ghosts ("Many reputed mysteries and occurrences cannot be explained away by scientific means, even in today's advanced world of technology," he avers in the introduction), this is understandable—a folklorist's job is to collect stories and oral traditions, not pass judgment on whether they are true or not. An interesting collection of ghost stories, this book is especially useful for folklorists and those seeking to understand social beliefs about ghosts. —B.R.

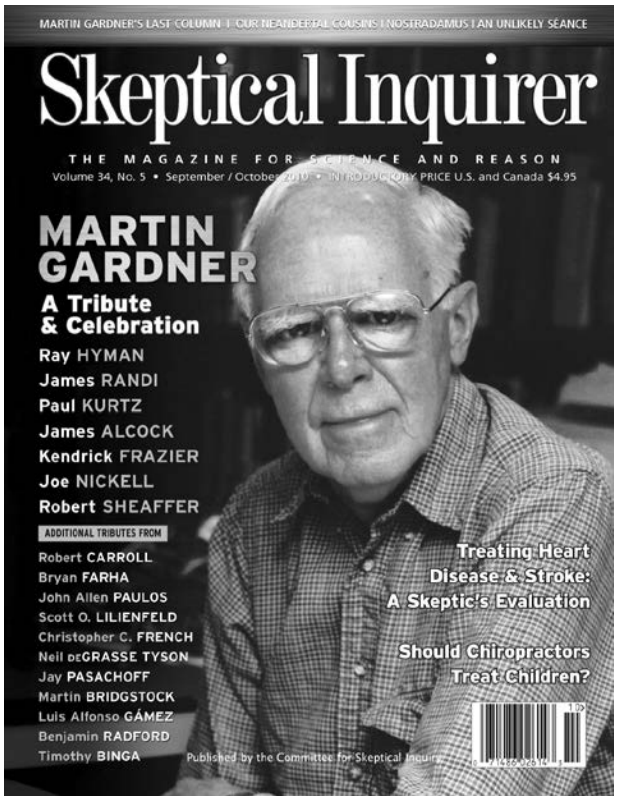
THE UNIVERSE: Order without Design. Carlos I. Calle. Prometheus Books, Amherst, New York, 2009. 304 pp. Hardcover, $27.98. Calle, author of *Coffee with Einstein* and a laboratory director and senior research physicist at the NASA Kennedy Space Flight Center, takes us on an excursion through the frontiers of modern cosmology— where scientific and philosophical questions about origins are being explored, including the very human-centered

question of whether the universe is designed for life. New models and scientific theories are taking us beyond the moment of the Big Bang. We might be a pocket universe among a large number of other pocket universes that have been coming into existence and evolving for an eternity, a cycle in an infinite series of cycles, or an observer-selected universe without an origin in real time. All three possibilities give us a universe without an origin: one in which nothing needs to be set in motion. All three models make testable predictions, so at some point new and better experiments and observations may allow us to better choose among them. —K.F.

UNSCIENTIFIC AMERICA: How Scientific Illiteracy Threatens Our Future. Revised and with a new introduction. Chris Mooney and Sheril Kirschenbaum. Basic Books, New York, 2010. 209 pp. Softcover, $15. This book is a lively and important exploration of the disturbing breakdown of relations between the world of American science and the U.S. public. Chris Mooney, a journalist specializing in issues at the intersection of science and society (and a SKEPTICAL INQUIRER contributing editor), and Sheril Kirschenbaum, a marine biologist and former White House science fellow, report on the breaks in the relationship between science and the public and call on the scientific community to much more actively engage the public in helping to repair the damaged bonds. This new and revised paperback edition finds their original concerns "confirmed by new data as well as more recent events." Now, it seems, scientists must take steps to protect themselves from political attacks (such as the so-called and now repudiated "Climategate") that seek to smear the reputation of science. Stem-cell research and vaccinations are other areas in which the attacks have worsened. The authors call on scientists to deepen their sensitivity to how the public thinks and responds on important issues (such as religion). They also point out some hopeful signs that at least in some quarters (e.g., Hollywood) the problem of an unscientific America may be somewhat on the mend. —K.F.



—Kendrick Frazier and Benjamin Radford



In Praise of Martin Gardner

I would like to add my voice to the chorus of others praising the late, great Martin Gardner ("Martin Gardner, 1914–2010: A Tribute and Celebration," SI, September/October 2010). He was always extremely kind to me as we chatted by mail over the years, and he provided jacket blurbs for a majority of my forty-five books. I dedicated my latest book, *The Math Book*, to him, and not long before he died he told me he was honored that I had included his *Scientific American* "Mathematical Games" column as one of the 250 great milestones in mathematics.

The authors of *Winning Ways for Your Mathematical Plays* wrote that Martin Gardner "brought more mathematics to more millions than anyone else." Allyn Jackson, deputy editor of the American Mathematics Society, wrote that Gardner "opened the eyes of the general public to the beauty and fascination of mathematics and inspired many to go on to make the subject their life's work." Indeed, several famous concepts in math were first brought to world attention through Gardner's works before they appeared in other publications.

Each year, as I begin to write my next popular mathematics book, I gaze at my bookshelves—filled with books by Martin Gardner—and ask myself, "What has Martin not already done? What hasn't he done?" Yes, Gardner is my hero and my inspiration, and his articles, books, and kind and humble approach to life will leave a mark upon the world forever.

Clifford A. Pickover
Yorktown Heights,
New York

James Randi makes the comment that being atheist himself, he was surprised that Gardner was a deist. I am not at all surprised that a leading skeptic might not be an atheist. My Oxford English Dictionary (short version) defines an atheist as one who disbelieves or denies the existence of God or gods. The terms *disbelieve* and *deny* are not the same. I can see the logic of a person saying he sees no evidence for the existence of a higher power and therefore disbelieves its existence, but to deny its existence—to seek to explain that there is no higher power—is as foolhardy as to believe on shaky evidence that there is one. Both are leaps of faith.

A higher power may have created everything and arranged for evolution to occur, perhaps giving a little push over the missing link. A higher power may or may not have an interest in our day-to-day affairs; it may or may not interact with us or the natural events of the earth (storms, earthquakes, etc.).

Perhaps Martin Gardner was again ahead of us all in realizing that his personal comfort was about the best he could do in answering the question of whether God exists.

Ken McCaffrey
Brattleboro, Vermont

Gardner on Swedenborg

Regarding Martin Gardner's last "Notes of a Fringe Watcher" column on Dr. Oz's infatuation with Swedish spiritualist Emanuel Swedenborg ("Swedenborg and Dr. Oz," SI, September/October 2010), it may please the readers of SI to know that Swedenborg's

influence in Sweden came to an end as early as 1790.

After the death of Swedenborg in London in 1772, his teachings attracted quite a devoted and influential Swedish following, embodied in the so-called Exegetial and Philanthropical Society. Mesmerism, the fashionable nonsense of the day, was soon employed by the society for its spiritualistic means. It was suggested that the somnambulic trance was a window to the worlds and spirit realms described by Swedenborg.

However, in defense of the ideals of the Enlightenment, poet and man of letters Johan Henrik Kellgren—along with his friend Nils von Rosenstein—formed the Pro Sensu Communi society in 1787 and launched what was the most successful Swedish skeptic campaign ever. The society never had more than those two members, but especially Kellgren used his wit and clever rhetoric to fend off the Swedenborgians, Mesmerism, and mysticism in general in a fierce debate in the newspaper *Stockholms-Posten*. Finally, the Exegetial and Philanthropical Society was dissolved. Its members fled abroad or dissociated themselves from Swedenborg's teachings.

Although Mesmerism re-emerged in Sweden some decades later, Swedenborgianism never did. Martin Gardner would certainly have enjoyed a translation of the Pro Sensu Communi battle.

Peter Illi
Eskilstuna, Sweden

I enjoyed the article by Martin Gardner about Dr. Oz and Swedenborg. SI readers may be interested to know that Swedenborg likely had temporal lobe epilepsy, specifically Gastaut-Geschwind syndrome. A description of Gastaut-Geschwind syndrome (which includes hyperreligiosity and hypergraphia) can be found in M.R. Trimble's *The Soul in the Brain* (Johns Hopkins University Press, 2007).

I wonder if Dr. Oz has ever commented on this possibility.

John T. Whitney
Holden, Maine

Treating and Preventing Heart Disease

I read with great interest Dr. Reynold Spector's article asserting that coronary artery bypass grafts are often overused to treat coronary artery disease, when medication and risk-factor modification (diet, exercise, control of weight and blood pressure) are, in many cases, just as efficacious ("A Skeptic's View of Prevention and Treatment of Heart Disease and Stroke," SI, September/October 2010). At age sixty, my father started to suffer from angina and was told that a triple-bypass operation was necessary to save his life. He had no previous major medical problems, despite being overweight, and he had never had a heart attack. He was prescribed several medications, which he was told would not keep him alive for more than six months if he did not have the triple-bypass operation. But he just could not bring himself to have open-heart surgery. He continued taking the prescribed heart medications, but he still refused to have the bypass operation.

That was in 1988. He is now eighty-two years old and still carefully follows his heart-medicine regimen daily. Periodically, his cardiologists have attempted in vain to convince him to have the bypass surgery, so it is doubtful that his arterial blockages were misdiagnosed. In the intervening twenty-two years, he has had one mild heart attack (about six years ago), which he recovered from. He also takes medication for his diabetes. Nevertheless, he lives independently in a studio apartment in New York City. He is a lifelong atheist, so he does not attribute his continued existence to prayer or miracles. He certainly does not distrust doctors or medical science; he regularly sees his doctors and follows their advice—except for their advice to have open-heart surgery.

I am very grateful for Dr. Spector's article, which comes as a type of epiphany answering how my father can still be alive twenty-two years after he was told that he needed a triple bypass to save his life. While Skeptical Inquirer has typically focused on debunking claims of so-called "alternative" medicine, Dr. Spector demonstrates that conventional medical practice also needs a skeptical eye at times, especially when there are financial incentives for performing a major operation that, in many cases, is unnecessary. I look forward to future articles exploring how the profit motive can distort the objective analysis of the best practices in medical care and treatment in the healthcare field and in general.

Howard Druan
Tucson, Arizona

Dr. Reynold Spector's very good overview of cardiovascular disease left me wondering why only in the last paragraph was there a marginal mention that lifestyles need to be addressed. Dr. Spector noted that overeating and diabetes must be considered. The most intriguing thing is that there is no mention of cigarette smoking. The author continues with, "We need to better understand the atherosclerotic process and then intervene to fix it."

Diabetes and smoking are estimated by the American Heart Association to increase the risk of heart attack and stroke by two to four times. Just as we cannot medically conquer cancer without eliminating our bad habits, environmental pollution, and genetic predisposition, it seems unlikely that a better understanding of plaque buildup will help fight heart disease if people don't stop overeating, smoking, or being lazy and complacent.

The bottom line: If there weren't so many smokers (estimated at over 50 million people), overeaters (one in four, which translates to about 80 million people), and people who sit in front of a TV, computer, or cell phone device for hours and hours a day, there would be little need to expend enormous amounts of energy, money, and resources on trying to keep these people alive. Exercising on a regular basis, playing with your kids, and doing mindful things seem to escape a significant portion of our population. Dr. Spector aptly ends his paper by telling us that current drugs and surgical intervention are not the final solution. But neither is a better medicine.

In my mind, educating our kids in the classroom, separate from their parental influence, would be helpful—both for the child and for the parents they come home to.

John Earl
Tunbridge, Vermont

I now have very healthy blood pressure after having hypertension (184/84 blood pressure), a stroke, heart attacks, and congestive heart failure. From my experience as a skeptic, I suggest the following reordering of

Dr. Spector's table 3, "Risk-Factor Modification": (1) Stop smoking, stupid. (2) Work up to walking thirty minutes a day, sixty minutes if overweight. (3) Balance your diet. (4) If walking doesn't curb diabetes, exercise reasonable blood sugar control. (5) Statins as a last or temporary method of control.

This places the responsibility of getting healthy on the person who is unhealthy and obeys the injunction, "First, do no harm."

Max Dalrymple
Albuquerque, New Mexico

Many thanks and congratulations for Dr. Spector's article on heart disease and stroke in the September/October issue. It is interesting that in the same issue Martin Gardner mentions that Dr. Oz performs more than 300 cardiac operations annually. Now the SKEPTICAL INQUIRER should find a medical skeptic as equally informed and knowledgeable as Dr. Spector to present similar articles regarding the colon and the prostate.

Jack D. Taylor
Flagstaff, Arizona

Chiropractors and Children

Samuel Homola writes, "I have always suspected that chiropractors who use their fingertips to feel subluxations in a baby's spine are either deceiving themselves or misinterpreting what they feel" ("Should Chiropractors Treat Children?" SI, September/October 2010).

May I humbly submit a third interpretation? They're faking.

At a "holistic health" fair, I once submitted to a free chiropractic examination. The chiropractor, a woman in this case, pressed on several places, working her way down my spine.

"Does this hurt?"

"No."

"Does this hurt?"

"No."

Finally, she dug her thumb very hard into my back. I said, "Ow!"

She said, "Ah, that's where your subluxation is."

Robert L. Wolke
Pittsburgh, Pennsylvania

Examining Nostradamus

In his excellent debunking of the validity of the prophecies of Nostradamus ("Nostradamus: A New Look at an Old Seer," SI, September/October 2010), Joe Nickell inadvertently gives the old fraud too much credit. Discussing the quatrain that supposedly predicts the Great Fire of London, Nickell writes that one verse could be seen as accurately predicting the fate of Mary Tudor, whose "atrocities resulted in her downfall." But Bloody Mary did not fall down. There were plots against her and bursts of opposition, but she surmounted them all and died as queen: still in power, still feared. So if that verse really was a prediction about Mary's reign, it was far off the mark.

David Dvorkin
www.dvorkin.com

The next time one of these Nostradamus quotes, pseudo-quotes, or outright hoaxes appears, consider this selection from Shakespeare:

> The cloud-capp'd towers,
> the gorgeous palaces,
> The solemn temples, the
> great globe itself,
> Yea all which it inherit
> shall dissolve,
> And, like this insubstantial
> pageant faded, leave
> not a rack behind:
> We are such stuff as
> dreams are made on,
> And our little life is
> rounded with a sleep.
> (*The Tempest*, Act IV,
> scene 1)

I submit that this passage is closer to describing the September 11, 2001, terrorist attacks than anything else that's circulated as a so-called "prediction"—which, of course, this isn't either. I still think that citing Shakespeare is an excellent way to show the absurdity in saying that Nostradamus predicted the terrorist attacks.

John Derr
Tijeras, New Mexico

Joe Nickell's column on Nostradamus reminded me of Bertrand Russell's dry comment about books concerning prophecy. Russell said that predictions of events occurring prior to the book's publication date showed remarkable accuracy, but predictions of events

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subsequent to the publication date were less reliable.

Marvin Schissel
Roslyn Heights, New York

Thinking about What We Read

Massimo Pigliucci rightly identifies some of the paradoxes in the theory that the Internet is bad for the brain ("The Internet Is Really Bad—Or Is It?" SI, September/October 2010), but when he proudly states that he now is reading three times as many books on his Kindle, I suspect that he misses the more serious point behind the controversy.

Is the voracious consumption of information not so much bad for one's brain as it is bad for the attainment of useful knowledge and insight? More may simply be more, or it may turn out to be less. When encountering thought-provoking material, considerable amounts of time must be allowed for deep processing. This necessitates entering into a dialogue with the author, asking relevant questions, conjuring thought experiments from alternative perspectives, assimilating the material into one's existing system of ideas, and creatively applying it in one's everyday life.

In my critical-thinking classes, I caution my students not to be mere sponges, acquiring tons of inert information at the expense of dynamic and transferable knowledge. To bring this to fruition, one must spend more time thinking about what one reads than actually reading.

Gerald Christoff
Flushing, New York

Cell Phones and Radiation

Bob Park's skepticism of the theory that cell phone radiation causes cancer is based on too simplistic an assumption (News and Comment, SI, September/October 2010). Mutations happen all the time. If all that was required to cause cancer was a mutation, we would all be dead. Cancer requires not only the mutation but an environment that allows the mutated cell to become cancerous. Many biological processes depend upon transport properties of membranes and conformal changes in molecules. These processes can be influenced by lower energies then those required for the breaking of chemical bonds. Although it is hard to imagine that nature could be so perverse as to have produced biological structures that interact with cell phone radiation in a manner that promotes the growth of cancers, it is still an issue that cannot be dismissed without a more careful analysis than that given by Park.

Even more disturbing is Park's dismissal of the Danish epidemiological study as being worthless. The epidemiological study does not require a full understanding of the biological and physical mechanisms that cause cancer. This makes it insensitive to errors in the assumptions about the mechanisms, but it also means that it is difficult to make the study a strict test of a particular mechanism.

Frankly, if the epidemiological results had indicated a link between cell phone use and cancer, I would be far more suspicious of plasticizers or some other chemical component of the cell phone—or a lifestyle correlation—than radiation. Regardless of the mechanism, a positive result would be important. The negative result that was obtained is far more welcome, and it indicates that if there are any relationships, they are unlikely to have major practical implications.

Robert Clear
Berkeley, California

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Skeptical Inquirer
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Venezuelan skeptic Sami Rozenbaum examines the strange story of president Hugo Chávez's exhumation of—and alleged conversations with—the bones of Simón Bolívar.

Will Africa Still Be Immersed in Deep Superstition by the Year 2030?
Barrett Brown examines a discussion in the journal *Foreign Policy* about the significance and influence of the Internet.

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HIDDEN MESSAGES by Dave Thomas

The following letters are a simple substitution cipher. If R stands for L, it will do so everywhere. Solution is by trial and error. Hint: Look for patterns in words; for example, the scrambled phrase "JRXJ JRQ" might represent "THAT THE."

PUZZLE

"XGFD GA E ICDEX XDEBNDC, LKX KHYWCXKHEXDOR GX MGOOA EOO GXA SKSGOA."

—OWKGA NDBXWC LDCOGWT

CLUE: R = Y

ANSWER KEY

As you decipher letters, keep track of them with the handy answer key below. If you've decided that R stands for L, simply write down an "L" above or below the "R" in the alphabetized row below, just as you would for the cipher itself. This builds a handy, easy-to-use reference guide for you and will also reveal the "Super Secret Word," a puzzle within a puzzle!

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

PREVIOUS PUZZLE SOLUTION: ***"I DISTRUST THOSE PEOPLE WHO KNOW SO WELL WHAT GOD WANTS THEM TO DO BECAUSE I NOTICE IT ALWAYS COINCIDES WITH THEIR OWN DESIRES."***

— SUSAN B. ANTHONY

SUPER-SECRET WORD: HYPOCRITE

(Instructions: www.nmsr.org/secretword.htm)

ASK THE OUTLAW SKEPTIC

Where no question or answer is too stupid

by Pablo DesOrmeaux

Dr. Outlaw,

After suffering a sharp pain behind my eyeballs, I visited my doctor, who immediately diagnosed the problem. His treatment was to get plenty of rest and apply Head-On to my forehead twice a day. What is a "skeptoid" anyway?

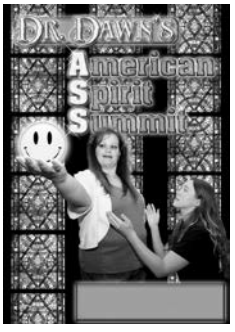
Forgot to Ask My Doctor

Dear Forgot,

A skeptoid is a mild, but sometimes painful, protuberance on the brain. Although a specific cause has remained elusive, some scientists theorize that it's triggered by a "skeptical strain in the brain." In other words, overindulging in skepticism. Currently, there's no real cure except time, although some researchers are tirelessly testing a promising new product, tentatively referred to as Preparation S. I suggest you follow your doctor's advice (think of the Head-On as a "placebo"), lay off any heavy, irritating doses of skepticism for a while, and avoid tight headgear.

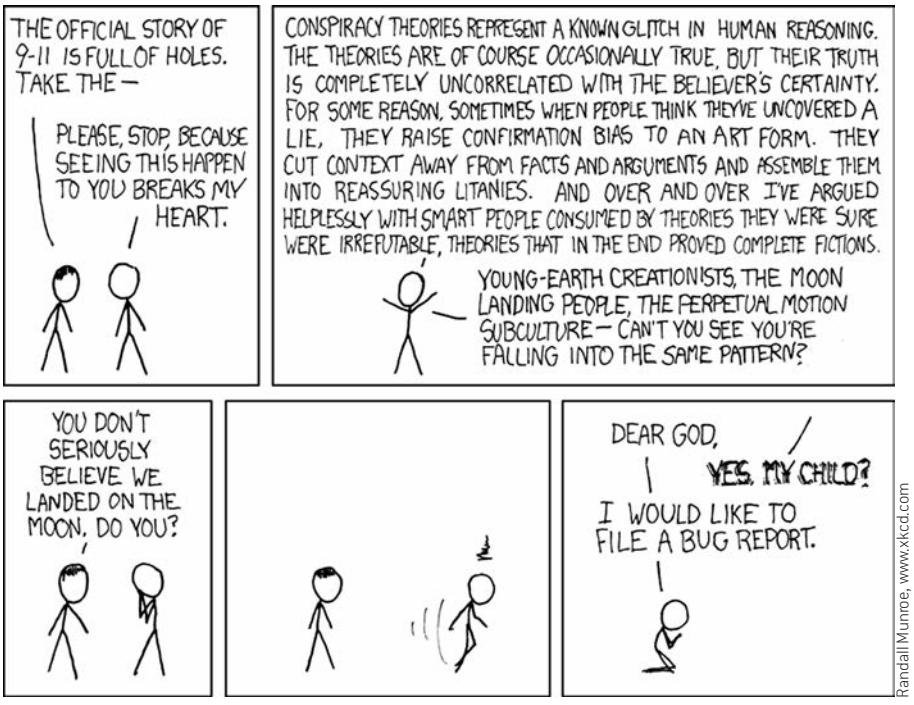
Hidden Messages Puzzle Contest

Submit your solution by e-mail to bradford@centerforinquiry.net or via postal mail to: Benjamin Radford, The Last Laugh, P.O. Box 3016, Corrales, NM 87048. Winner will be chosen at random from the first three correct submissions received by both e-mail and postal mail.



This issue's prize is a copy of the film *Dr. Dawn's American Spirit Summit*, an indie mockumentary from Exspiro Productions (http://www.americanspiritsummit.com/).

xkcd "Conspiracy Theories"


THE OFFICIAL STORY OF 9-11 IS FULL OF HOLES. TAKE THE—
PLEASE, STOP. BECAUSE SEEING THIS HAPPEN TO YOU BREAKS MY HEART.
CONSPIRACY THEORIES REPRESENT A KNOWN GLITCH IN HUMAN REASONING. THE THEORIES ARE OF COURSE OCCASIONALLY TRUE, BUT THEIR TRUTH IS COMPLETELY UNCORRELATED WITH THE BELIEVER'S CERTAINTY. FOR SOME REASON, SOMETIMES WHEN PEOPLE THINK THEY'VE UNCOVERED A LIE, THEY RAISE CONFIRMATION BIAS TO AN ART FORM. THEY CUT CONTEXT AWAY FROM FACTS AND ARGUMENTS AND ASSEMBLE THEM INTO REASSURING LITANIES. AND OVER AND OVER I'VE ARGUED HELPLESSLY WITH SMART PEOPLE CONSUMED BY THEORIES THEY WERE SURE WERE IRREFUTABLE, THEORIES THAT IN THE END PROVED COMPLETE FICTIONS.
YOUNG-EARTH CREATIONISTS, THE MOON LANDING PEOPLE, THE PERPETUAL MOTION SUBCULTURE— CAN'T YOU SEE YOU'RE FALLING INTO THE SAME PATTERN?
YOU DON'T SERIOUSLY BELIEVE WE LANDED ON THE MOON, DO YOU?
DEAR GOD,
YES, MY CHILD?
I WOULD LIKE TO FILE A BUG REPORT.

Randall Munroe, www.xkcd.com

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The organizations listed above have aims similar to those of the Committee for Skeptical Inquiry but are independent and autonomous. Representatives of these organizations cannot speak on behalf of CSI. Please send updates to Barry Karr, P.O. Box 703, Amherst NY 14226-0703.

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